CALIFORNIA NURSE WORKFORCE INITIATIVE

CALIFORNIA'S NURSING LABOR FORCE:

DEMAND, SUPPLY, AND SHORTAGES

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California Nurse Workforce Initiative
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I. Introduction

In recent years, attention has focused on the nursing profession due to a crippling shortage of registered nurses (RNs) that has been reported throughout California, the United States, and in many other countries (Buerhaus 2001; Murray, 2002; Spetz and Given, 2003). California's nursing shortage is among the most severe in the United States (U.S. Bureau of Health Professions, 2002). Many of the State's hospitals are having great difficulty recruiting and retaining licensed nurses (Kucher, 2000). California likely needs over 60,000 additional licensed nurses to meet the projected demand for nursing services in 2020 (Coffman and Spetz, 1999), and even larger numbers are needed nationally (Buerhaus, Staiger, and Auerbach, 2000). The California Employment Development Department predicts that there will be 97,500 job openings for RNs and 27,100 openings for licensed vocational nurses (LVNs) by 2010 (California Employment Development Department, 2003).

In response to the nursing shortage in California, Governor Gray Davis announced the Nurse Workforce Initiative in his January 2002 State-of-the-State speech. The purpose of the Nurse Workforce Initiative (NWI) is to develop and implement proposals to recruit, train, and retain nurses both to address the current shortage of nurses in California and to support implementation of new hospital nurse-to-patient staffing ratios also announced in late January 2002. The Governor made available $60 million over three years for the NWI. The NWI includes components designed to address the nurse shortage using both short and longer-term strategies, including regional training collaboratives, scholarships for nursing students, career ladder projects, workplace reform efforts, and other strategies to increase the number of nurses. The NWI also includes an evaluation of the initiative, to determine which strategies to increase the supply of nurses are most effective and improve our understanding of the labor market dynamics for nurses.

This report provides preliminary information on the labor market of nurses in California. We begin with a descriptive overview of the nursing labor market in Chapter II, focusing on the institutions and regulations that affect the labor market. Chapter III

then provides in-depth information about the demand for nurses, as well as exploring the types of health care providers that employ nurses and the regulations they face. The supply side of the labor market is described in Chapter IV, with descriptions of the characteristics of the current supply of nurses, and the flows of nurses into and out of the workforce. Chapter V explicates how the demand and supply for nurses lead to the labor market outcomes of employment levels, wages, and fringe benefits. This chapter concludes by presenting information about inter-firm mobility of nurses and working conditions. Chapter VI describes nursing shortages in depth, with an explanation of the economics underlying them and a review of potential solutions. We conclude with Chapter VII, by offering directions for future analysis.

II. Nursing in California: An Overview

A. Nursing in California

Licensed nurses constitute the single largest occupation in the health care industry (Coffman, Spetz, Seago, et al., 2001). The majority of licensed nurses work in hospitals, and nurses also practice in a variety of other settings, including homes, schools, clinics, physicians' offices, long-term care facilities, and public health agencies. Nurses play a critical role in the provision of health care because their scope of practice places them in direct contact with patients in most health care environments. Patients rely on licensed nurses to assess, treat, and monitor their diseases and conditions, and to educate them about maintaining health and managing chronic illness.

Licensed nurses include both licensed vocational nurses (LVNs) and registered nurses (RNs). LVNs obtain their licensure after completing a one or two year program at a community college, an adult educational program, or private vocational school, and passing an examination approved by the Board of Licensed Vocational Nursing and Psychiatric Technicians. In all other states except Texas, LVNs are called "licensed practical nurses" (LPNs). The duties and responsibilities allowed by an LVN/LPN license vary across states. In most states, an LVN's scope of practice includes provision of basic hygienic and nursing care, measurement of vital signs, performance of prescribed medical treatments, administration of prescribed medications, and performance of non-medicated intravenous therapy and blood withdrawal (U.S. Department of Labor, 2002).

Registered nurses (RNs) obtain their licensure after completing an associate degree, baccalaureate, or diploma nursing program and passing an examination approved by the Board of Registered Nursing. RN education requires two to four years of coursework, but more time often is needed to complete RN programs due to prerequisite requirements and overcrowded campuses (Seago and Spetz, 2002). The scope of practice of RNs is broader than that of LVNs, allowing the assessment of patients, development of care plans, providing intravenous medications, administering blood products, and provision of other complex therapies and treatments. As a result of this broad scope of

practice, RNs are employed more frequently in environments in which patients are severely ill, such as hospitals (U.S. Department of Labor, 2002).

California's nursing workforce consists of 280,000 RNs and 90,000 LVNs. Approximately 81 percent of the State's RNs are working in nursing (U.S. Bureau of Health Professions, 2000).[1] Hospitals employ the greatest share of RNs, with 60 percent of RNs working in hospitals. LVNs predominantly work in hospitals and nursing homes, with 28 percent in hospitals and 26 percent in nursing homes (CA Employment Development Department, 2001). In 2001, California's RNs earned an average of $27.27 per hour, and LVNs earned an average of $14.83 per hour (CA Employment Development Department, 2001). In the 2001-2002 Fiscal Year (June 30-June 29), average hourly hospital wages were $30.29 for RNs and $18.73 for LVNs (OSHPD Annual Disclosure Reports).

B. Features of Nursing Labor Markets

The nursing labor market exhibits a number of features that distinguish it from other professional labor markets. The most important characteristic of nursing is that it is a licensed profession. The Boards of Licensed Vocational Nursing and Psychiatric Technicians (BLVNPT) and Registered Nursing (BRN) license nurses in California, after potential nurses have completed an approved nursing education program and passed the exam appropriate to their license. Without a license, an individual cannot perform a variety of tasks that are essential to the provision of health care. The goal of the Boards is to protect consumers, who are vulnerable to poor care when they interact with the health care system. As a result of licensure, entry into the profession of nursing is restricted.

The demand for licensed nurses also is controlled by consumer protection-oriented regulations. The California Department of Health Services (DHS), Licensing and Certification Division, requires that hospitals and nursing homes meet certain nurse staffing requirements. The goal of DHS is to ensure that hospitals can provide adequate patient care, and because only licensed nurses provide many health care services, DHS

[1] The share of licensed vocational nurses who are working in nursing jobs is not available from any data source of which we are aware.

focuses on licensed nurse staffing. Federally certified nursing homes are required to have a RN director of nursing and a RN on duty 8 hours a day, seven days a week. If the facility has under 60 beds, the director of nursing can serve as the RN on duty (Harrington, 2001). They also must have a licensed nurse (RN or LVN) on duty during all other shifts. Under California regulations, a nursing home must have a RN on duty 24 hours a day if the facility has 100 or more beds. Hospitals are required to have a system in place to measure the acuity of illness of patients and determine appropriate staffing. Since January 2004, hospitals also have had minimum nurse-to-patient ratio requirements that exist in tandem with the patient acuity measurement systems. As a result of these regulations, the demand for licensed nurses is not as flexible as in other labor markets.

The regulations of the BLVNPT, BRN, and DHS contribute to the slow responses to market changes inherent in the nursing labor market. This "stickiness" of the labor market is exacerbated by the dominance of relatively few institutions in the labor market. The supply of new licensed nurses is primarily dependent on nursing programs in colleges and universities. Although there are 87 programs that offer entry-level LVN education and 100 programs that offer entry-level RN education, there are substantially more qualified applicants for these programs than space in these programs (Seago and Spetz, 2003).

The demand for licensed nurses is concentrated in the hospital and nursing home industries, and these employers increasingly are consolidated into multi-site corporations (Spetz, Mitchell, and Seago, 2000). The employers of registered nurses include not-for-profit, for-profit, and government organizations, with not-for-profit companies dominating the hospital market and for-profit companies holding the majority of the nursing home market (CA Office of Statewide Health Planning and Development, 2003). Other types of health care providers are demanding progressively greater numbers of licensed nurses, particularly ambulatory care and home health providers (CA Employment Development Department, 2001). Even during time periods when nursing surpluses are reported, unemployment rates for licensed nurses have been very low, never topping 1.5 percent (Levine, 2001).

Labor markets for licensed nurses generally are not national in scope. In some geographic regions there are few employers and these employers may have a high degree

of control over the local labor market. Other nursing labor markets are very competitive, with a plethora of employers. Because job opportunities for licensed nurses are plentiful at nearly all times, nurses usually do not need to relocate to find interesting and rewarding work. In addition, two-thirds of RNs are married and thus may not be geographically mobile because they must coordinate their employment with their spouses' (U.S. Bureau of Health Professions, 2000). In a single year, only five percent of California's RNs move to a new county; thus, it is important to ensure that supplies of new nurses are distributed across regions (U.S. Bureau of Health Professions, 2000).

C. Nursing Shortages

At present, there is a significant shortage of licensed nurses in the United States (Gurnon, 1997; Buerhaus, 1998; Kelley, 1998; Buerhaus 1999; Kilborn, 1999; Buerhaus and Staiger, 1999; Spetz and Given, 2003). Reports of nursing shortages in the United States have arisen regularly over the past 60 years (Yett, 1975; Friss, 1994). Prior to the current shortage, the most recent shortage was reported in the late 1980s and early 1990s (Aiken and Mullinix, 1987). By the mid-1990s, these complaints of shortage were replaced with concerns that there was an oversupply of nurses, largely due to the growth of managed care in the United States (Aiken, Sochalski, and Anderson, 1996; Buerhaus and Staiger, 1996). However, by 1998, stories of shortage resurfaced, particularly in nursing specialties such as critical care and on the western and eastern coasts of the United States (Gurnon, 1997; Kilborn, 1999).

A shortage of labor is defined as occurring when the supply of labor is not as large as the demand for that labor, at the current wage. When there are shortages of labor, employers respond by increasing the wages they offer. These wage increases should result in an increase in the supply of labor since the financial returns to employment are larger. There also should be a decline in the demand for labor, because employers will look for ways to reduce their use of labor as its price rises. The combined effect of the increase in supply and decrease in demand is an abatement of the shortage.

However, a shortage can become persistent for several reasons: wages might not adjust, supply might not increase, or demand might not decline. For example, changes in supply or demand might not occur immediately because of a pre-established delay, such

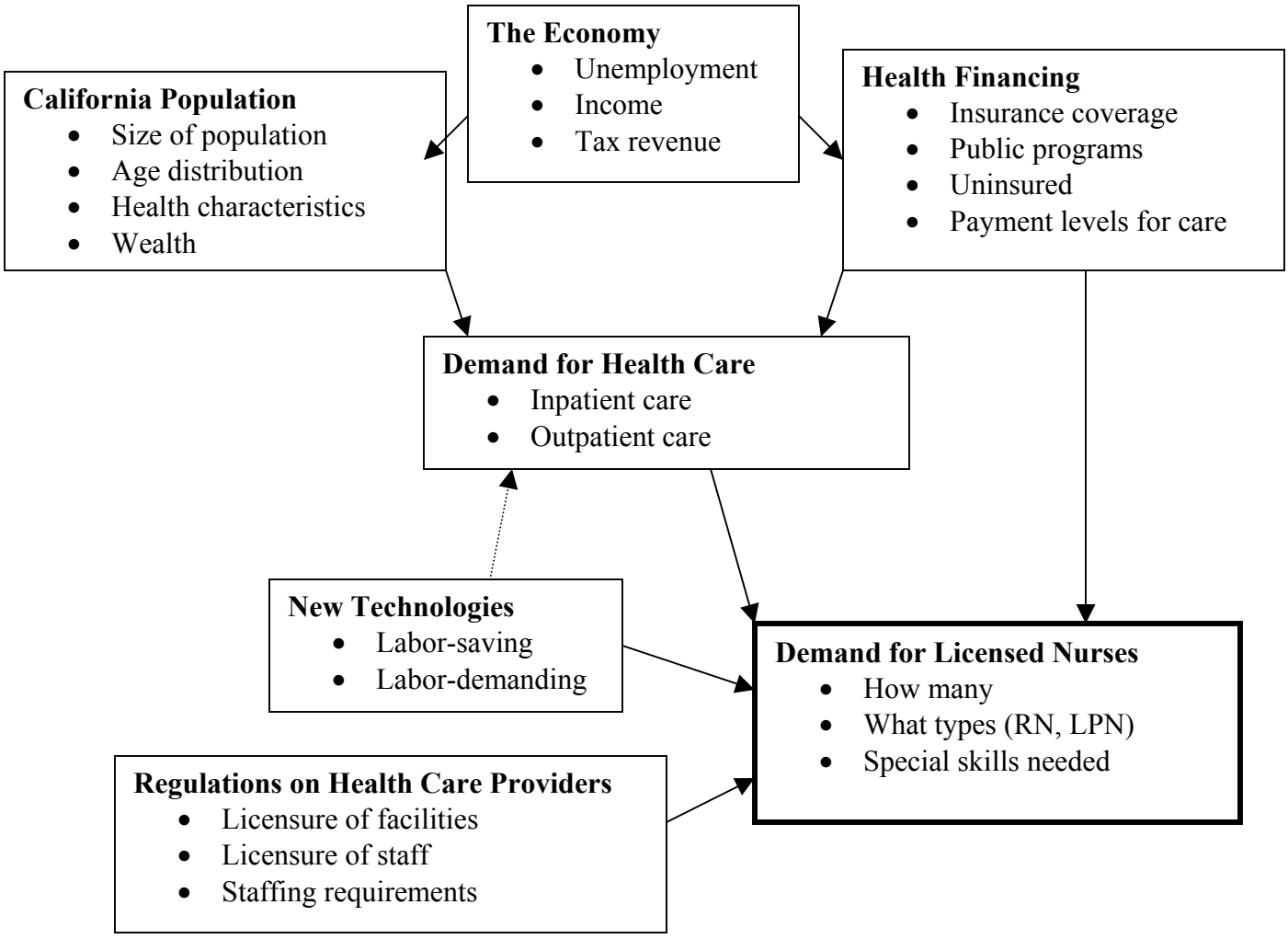
as the time it takes to train a worker. Nursing labor markets might have all three of these difficulties in rectifying shortages. Many employers of nurses face limited revenues because their services are reimbursed by government programs and their private revenues are determined by pre-existing contracts. Thus, employers cannot easily absorb increased labor costs. Furthermore, the supply of licensed nurses is restricted by the size of the educational system and licensure regulations. Also, the demand for licensed nurses is controlled by various regulations that prevent health care providers from reducing their nurse staffing.

In a labor market such as nursing, government intervention may be required to alleviate shortages. However, for such intervention to be effective, policymakers must have a deep understanding of the supply and demand forces pervading the market. The next three chapters of this report are a preliminary effort to offer California's policymakers the information they need to prevent and address future shortages of licensed nurses.

III. The Demand for Nurses

The demand for licensed nurses is derived from the demand for health care, and is affected by a variety of factors, including the general population's demographics and health, new medical treatments, health care payment systems, and health care regulations. Figure 1 depicts how these factors contribute to the demand for nurses in California. In this chapter, we examine each of these factors.

Figure 1: Factors Affecting Demand for Licensed Nurses



A. Demographics and the Demand for Health Care

Population characteristics and growth

The dominant determinant of the demand for health care is the size of California's population. As the population increases, the demand for health care services rises. This is true whether the population growth arises from new births, interstate migration, international immigration, or lower death rates. Each of these components of population change is associated with increased demand for particular types of care. High birth rates increase the demand for prenatal care, obstetric services, and pediatric care. International immigration may increase demand for preventive services for chronic and acute diseases that are more prevalent among immigrants, such as tuberculosis. Lower death rates result in a growing elderly population, which demands geriatric health care services. California's population is expected to grow 33 percent between 2000 and 2020 (California Department of Finance, 2001), and the demand for health care also should grow substantially over this time.

As suggested above, the age distribution of the population has an important effect on the demand for health care. Children require relatively little treatment for serious, acute ailments, but typically demand many preventive services such as vaccines. As more children experience chronic illnesses, demand for ambulatory care rises. Young adults tend not to demand many health care services. Young women require routine gynecological care, and young men and women episodically seek care in response to illness or accidents. Child-bearing women demand greater health care services during their pregnancies and postpartum period. As people age, they require more preventative services, such as screening for high blood cholesterol, breast cancer, prostate cancer, and colorectal cancer. These also are the ages at which increases in rates of cancer and heart disease are observed. As individuals continue to age, their health needs grow. In general, populations that have a high share of elderly individuals demand more health care services. The future aging of the California population is expected to increase the demand for health care services dramatically (Coffman, Spetz, Seago, et al., 2001).

Specific health characteristics of the population have a substantial effect on the demand for health care, beyond the age distribution of the population. Local cultural

patterns such as food preferences and popularity of exercise can affect population health. Obesity is more prevalent in some communities than others. If a population exhibits a high rate of chronic illness, such as diabetes, asthma, or heart disease, there will be higher demand for outpatient services to manage these ailments. If such outpatient services are not available, there will be greater demand for inpatient hospital care since people with chronic illnesses are more likely to have events demanding acute care if they do not obtain appropriate outpatient care. Thus, the specific health needs of local populations have a substantial effect on the level and composition of health services demanded.

The wealth of a population also affects its demand for health services. In general, individuals with higher family income face fewer chronic diseases and are better able to engage in preventative behaviors. These characteristics reduce the overall demand for health care, particularly for acute care services. On the other hand, wealthier individuals also are more likely to seek health care services that improve quality of life, such as prescription antihistamines and cosmetic surgery. Some research suggests that higher levels of wealth are associated with unhealthy behaviors, such as alcohol consumption and lack of exercise (Feinstein, 1993), so populations with high per capita income may have special health needs. Communities with low per-capita incomes face different problems, ranging from diseases that are easily communicated in overcrowded housing conditions, to poor nutrition, to poor dental care, and to violence. The ambulatory and inpatient health care needs in these communities typically are greater than in wealthier communities; also, different types of services are demanded.

Financing of health care services

The method by which health care is financed has a significant effect on the demand for health care. It is well known that individuals who have health insurance use more health care services, and demand for health care is inversely related to the size of copayments made by patients (Manning, Newhouse, Duan, et al., 1987). Public insurance programs increase the use of health care services among those who would otherwise be uninsured. However, publicly funded insurance, such as Medi-Cal, also changes the composition of services demanded. Individuals with health insurance tend to demand more primary care and outpatient services, while uninsured individuals more

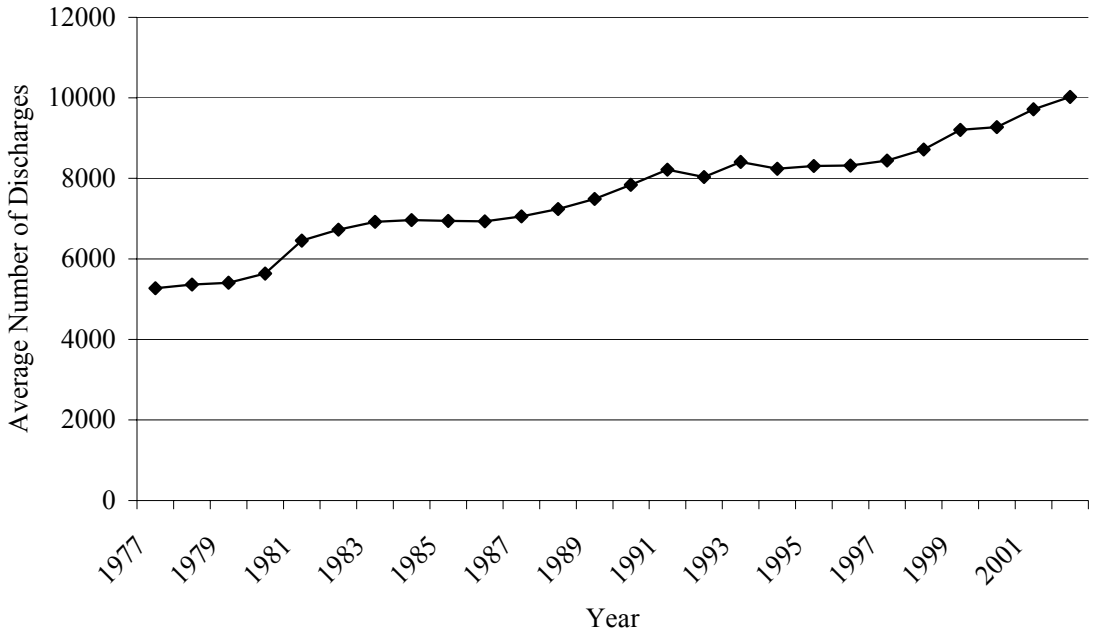
often obtain their health care through hospitals and emergency clinics (Smith-Campbell, 2000; Elixhauser, Machlin, Zodet, et al., 2002; Dohan, 2002). Over 6.3 million Californians – 21 percent of the population – did not have health insurance at some time during 2001 (Brown & Lavarreda, 2003). Senate Bill 2, passed in California's 2003 legislative session, requires that employers offer health insurance to their employees; this legislation could change the demand for health care in the State.

The structure and reimbursement mechanisms used by health insurance plans can affect the demand for health care. In the early 1980s, the federal Medicare system, which provides health insurance for the elderly, changed to the Prospective Payment System (PPS). In this system, all inpatient diagnoses were grouped into categories, and payments to hospitals were based on these Diagnosis-Related Groups. If the cost of caring for a patient cost less than the payment received, the hospital could earn a profit; however, the hospital also faced a risk of financial loss. In response to PPS, hospitals actively worked to reduce the length of inpatient hospital stays, and they moved many health care services to the outpatient setting. The net effect was a reduction in demand for inpatient health care, but increases in outpatient surgery and certain types of ambulatory care.

At the same time PPS came into effect, California implemented legislation that allowed for the growth of Health Maintenance Organizations (HMOs) and Preferred Provider Organizations (PPOs). These managed care insurance plans strive to reduce the use of expensive health care services. As a result, they may increase use of preventive services, such as routine screenings for disease. In the mid-1980s and mid-1990s, as Medicare PPS evolved and managed care expanded in California, the rate of inpatient hospitalization declined and hospitals reported fewer patient discharges (Figure 2).

Over the past few years, managed care has retreated from active cost-control strategies (Lesser, Ginsburg, and Devers, 2003). At the same time, hospital utilization has increased, as seen in Figure 2. Concordantly, health care costs have been rising at double-digit rates (Strunk & Ginsberg, 2003). If managed care continues to diminish in its effectiveness, demand for health care might continue to grow at a faster rate than in the past decade (Strunk & Ginsberg, 2003).

Figure 2: Average Per-Hospital Discharges, California , 1977-2002



Source: California Office of Statewide Health Planning and Development, Annual Hospital Disclosure Reports

The economy and demand for health care

The status of the economy affects demand for health care in several ways. First, the unemployment that accompanies economic recession leads to increases in both the number of people who are uninsured and the number who receive health insurance through Medi-Cal. As discussed above, these changes in insurance coverage affect the demand for health services.

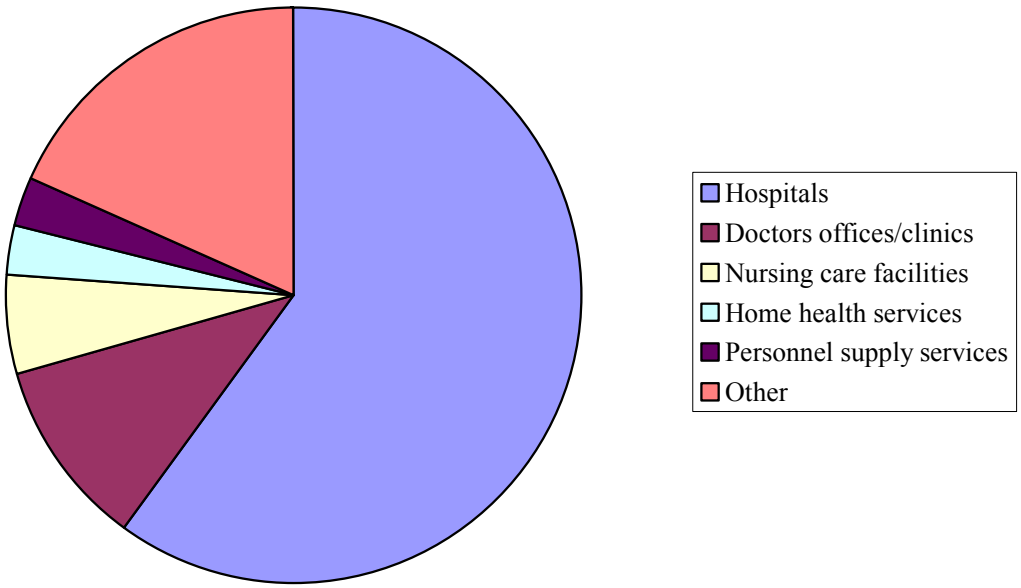
Second, a small body of research suggests that economic recession has a direct negative effect on the health of the population (Gerdtham & Johannesson, 2003). Increased stress due to unemployment, unhealthy behaviors that arise in response to stress (such as consuming alcohol), and difficulty affording healthy food may explain these findings. However, some research has found that economic growth is more closely associated with declines in community health (Ruhm, 2001; Gerdtham and Ruhm, 2002). Rises and falls in California's economy may affect the demand for health care, although the exact nature of the relationship is unclear.

B. The Demand for Health Care and the Demand for Nurses

The employers of licensed nurses

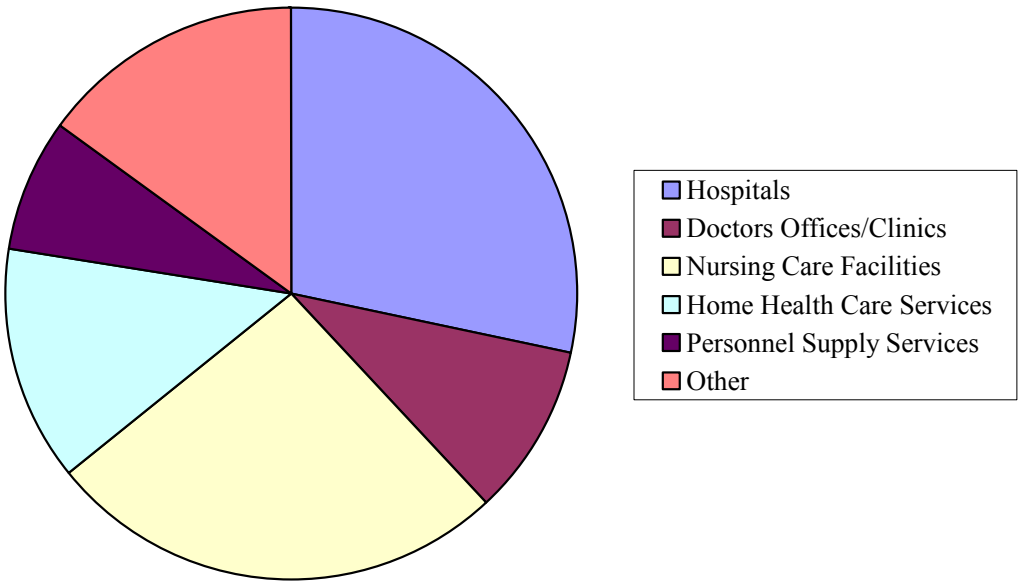
Health care providers rely on licensed nurses to provide the majority of direct patient care. Registered nurses assess patients, develop plans for their care, perform tests, provide medical treatments, plan for patients' discharges, teach patients and their families how to provide ongoing care, and keep detailed records of all these activities. Licensed vocational nurses assist in patient assessments and the development of care plans, provide medications to patients, start intravenous fluids, obtain blood samples, and participate in numerous other components of patient care. Without licensed nurses, many health care providers could not care for patients. Figure 3 presents RN employment by setting, and Figure 4 presents the settings in which LVNs work.

Figure 3: Employment Settings in Which RNs Work, 2001



Source: California Employment Development Department, Occupational Employment Statistics Survey, 2001.

Figure 4: Employment Settings in Which LVNs Work, 2001



Source: California Employment Development Department, Occupational Employment Statistics Survey, 2001.

The dominant employer of licensed nurses is the hospital industry, although RNs are more likely to work in hospitals than are LVNs. As the number of patients and patient days in hospitals rise, demand for RNs and LVNs rises (Spetz, 1999). The increasing acuity of illness of patients in the hospital makes RNs particularly important to hospital care, as does the diffusion of high-technology medical services in hospitals (Spetz, 1999). LVNs are restricted from giving patients medications through intravenous lines (IVs), administering blood products, and providing other types of care that are critical in the hospital setting. These restrictions reduce the usefulness of LVNs to hospitals, and thus the demand for LVNs has declined in California hospitals since the mid-1980s (Spetz, 1999). Hospitals also demand RNs with special training and certification in surgery, anesthesia administration, critical care, and other types of care primarily provided by hospitals.

A high share of LVNs work in nursing homes and long-term care facilities; relatively fewer RNs work in such settings. Patients in nursing homes generally do not receive complex treatments such as IV medication therapy, and thus much of the patient

care in nursing homes can be provided by LVNs and unlicensed nursing personnel. LVNs assist in the ongoing assessment of nursing home patients and the administration of oral medications.

A growing share of licensed nurses works in ambulatory care settings, such as outpatient surgery centers, doctor's offices, and urgent care clinics. In these settings, licensed nurses have a wide range of responsibilities, ranging from assessing patients to providing medical care to maintaining records. Many nurse practitioners (NPs) and certified nurse midwives work in outpatient care environments.

Home health is another industry in which there has been growing demand for licensed nurses. The growth of managed care and subsequent waning of the use of hospital care led to an increased need for home health care. RNs and LVNs are instrumental in providing home health services, as they can deliver medications, monitor patients, and teach self-care strategies.

Health care services are provided in a variety of other environments, such as schools, private companies, and public health departments. Public and private school districts employ school nurses to address the health needs of their students. By law, school nurses must be master's prepared RNs. Private companies use occupational health nurses to develop workplace safety programs and monitor the health of their employees. Public health departments employ nurses in a variety of roles, ranging from patient care in clinics to management of public health programs. Certified public health nurses are particularly valuable to public health departments.

Licensed nurses also hold jobs that do not involve direct patient care. Some of these positions are administrative and managerial jobs within patient care environments such as hospitals and nursing homes. Licensed nurses work in utilization review departments, management offices, research laboratories, and other departments within health care organizations. Licensed nurses also hold positions in health care organizations that do not provide direct patient care, such as insurance companies, disease management software development companies, and pharmaceutical firms. Because they have a broad understanding of health, the disease process, and patient care, licensed nurses bring clinical expertise to management, development, sales, and marketing teams.

Finally, RNs work in education programs, as teachers of new RNs and LVNs. Most nursing education programs rely upon RNs with graduate degrees in nursing, as explained below.

Health care financing and delivery

The financing of health care affects the demand for licensed nurses in two ways. First, restricted reimbursements to health care providers reduce demand for health care services and thus fewer licensed nurses are needed to provide care. Second, when health care providers face tighter budgets, they are more inclined to substitute unlicensed nursing personnel for licensed nurses. Health care providers have seen reductions in revenues as a result of managed care, Medicare's Prospective Payment System, and declining Medi-Cal payments. Increased demand for charity care services by the uninsured also reduces the funds available to health care providers to hire licensed nurses.

At the same time that managed care insurance gained dominance in health care financing, health care providers consolidated into multi-site corporations (Spetz, Mitchell, and Seago, 2000). Multi-hospital corporations, both for profit and not-for-profit, grew substantially over the past two decades, so that by 2000, over half of California's hospitals were in multi-hospital systems (Spetz, Mitchell, and Seago, 2000). Multi-site corporations also are dominant in the long-term care industry. Some corporations are vertically integrated, owning hospitals, nursing homes, medical groups, and other health care services. There has been little research on the effects of system integration on the demand for and wages of licensed nurses. Two recent working papers find that hospitals demand fewer RNs after joining multi-hospital systems (Currie, 2003; Spetz, Seago, and Mitchell, 2003).

Economic cycles also affect the demand for nurses. During recessions, the number of uninsured Californians rises. More uninsured patients increase the charity care burden of health care providers. Recessions also result in decreased government revenue. Governments respond to revenue shortfalls by reducing expenditures for government programs. For government-financed health care programs such as Medi-Cal, this usually equates to lower reimbursements to health care providers. Both of these

things lead to greater financial pressure for health care providers, and thus demand for licensed nurses may decline during recessions.

Regulatory effects on nurse demand

State and federal regulations affect the demand for licensed nurses. Health care facilities in California are licensed by the California Department of Health Services (DHS), and maintenance of operating licenses requires meeting staffing requirements established by DHS. Nursing homes face licensed nurse staffing requirements under both federal and state regulations. Federally certified nursing homes are required to have a RN director of nursing and a RN on duty 8 hours a day, seven days a week. If the facility has under 60 beds, the director of nursing can serve as the RN on duty (Harrington, 2001). They also must have a licensed nurse (RN or LVN) on duty during all other shifts. Under California regulations, a nursing home must have a RN on duty 24 hours a day if the facility has 100 or more beds.

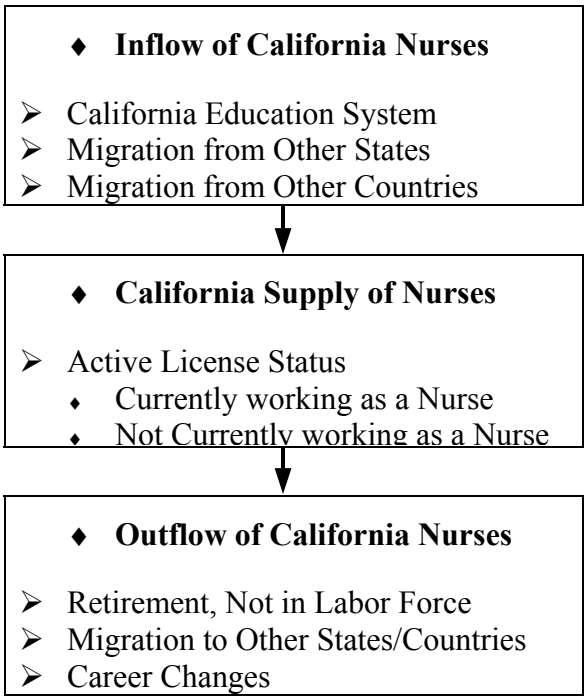
Hospitals are required to have a system in place to measure the acuity of illness of patients and determine appropriate staffing (Title 22, Division 5, Chapter 1, Article 6, Section §70495(e)). Since the mid-1970s, hospital critical and intensive care units have been required to have no less than one licensed nurse for every two patients, and half of these licensed nurses must be RNs (Title 22, Division 5, Chapter 1, Article 6, Section §70495(e)). In January 2004, hospitals also will face minimum licensed nurse-to-patient ratio requirements in other hospital units, as established by Assembly Bill 394 (Chapter 945, Statutes of 1999). Several estimates of the effect of these ratios on demand for licensed nurses have been published. The DHS analysis, conducted by researchers at the University of California, Davis, predicts that 5,820 new nurses will be needed in California hospitals to meet the staffing requirements (Kravitz, Sauve, Hodge, et al., 2002). Alternative analyses conducted by independent researchers have reported that the increased demand for nurses due to the ratios could be as low as 1,600 (Spetz, 2002.).

IV. The Supply of Nurses

A. Overview of California's Supply of Nurses

The supply of nurses consists of nurses with active licenses. Some of these nurses are not working in nursing, but they are part of the current pool of nurses available to work in California. The supply of nurses increases as nurses flow into the labor market by graduating from California nursing programs, migrating from other states, or immigrating from other countries. The supply of nurses declines with retirements, migration out of California, and career changes out of nursing. Figure 5 summarizes the labor flows in and out of the California stock of licensed nurses. This chapter examines each of the components of this diagram.

Figure 5: Flows and Stock of California Nurses



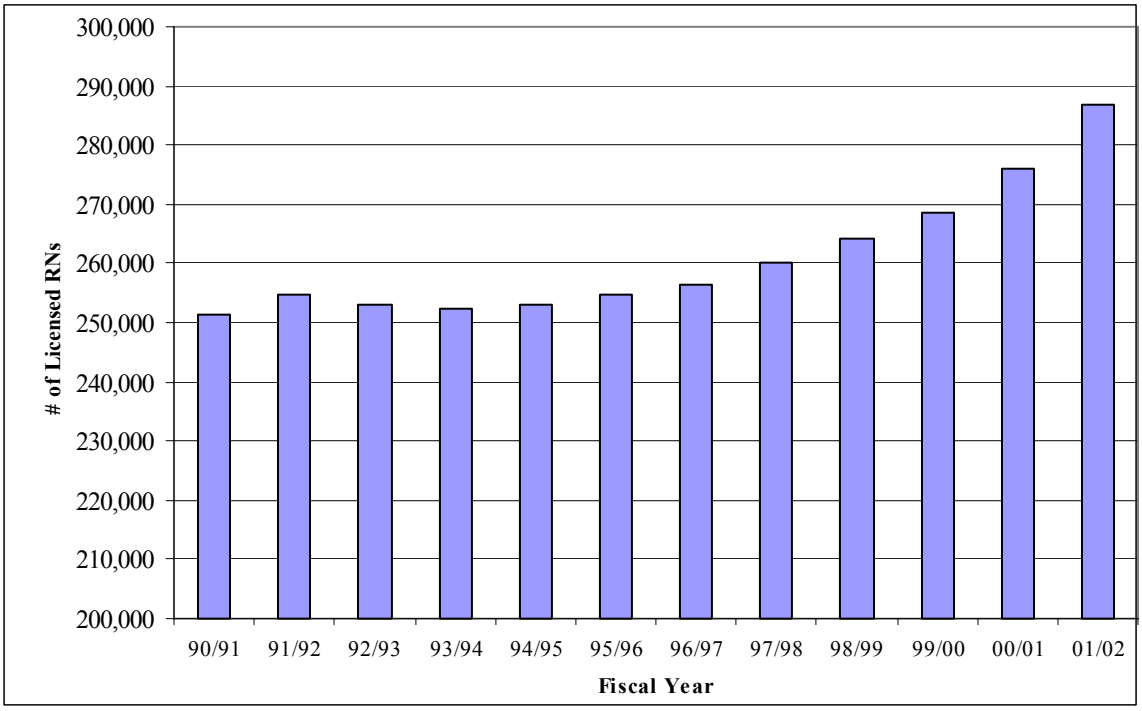
The Stock of California Nurses

The number of licensed nurses in California

In 2003, there were approximately 280,000 registered nurses and 90,000 licensed vocational nurses in California. The number of registered nurses in California grew steadily from the mid-1990s through 2001 after being stagnant in the early 1990s (see Figure 6). The increase in the supply of RNs over the past several years is even more pronounced when the RN population is examined according to active license status. Figure 7 shows the percent of registered nurses with an active license and the percent with an inactive license between 1990 and 2001. Not only did the number of registered nurses increase during the 1990s, but the number of *active* registered nurses also increased during this period. Similarly, the percent of California registered nurses employed in nursing increased from approximately 77 percent in 1996 to 81 percent in 2000 (see Figure 8). Comparable data are not available for LVNs.

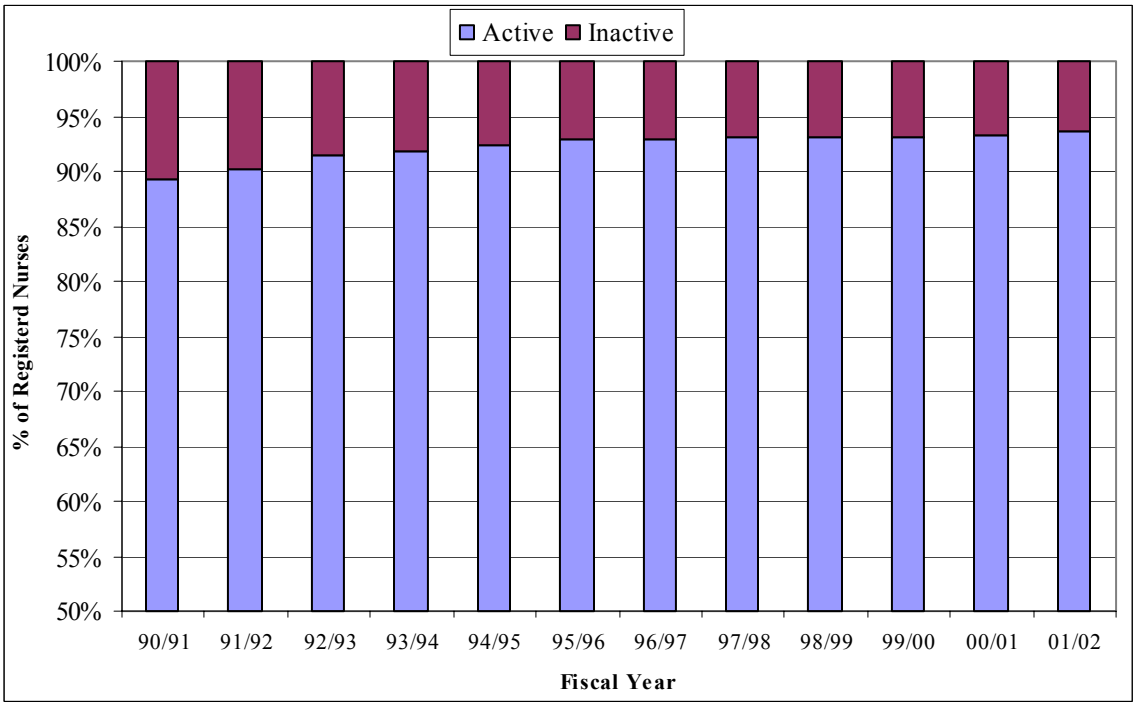
The changes in the California stock of nurses presented in Figures 5 through 8 are based on analysis of cross-sectional data, which precludes us from making any conclusions regarding the movements of individual nurses between active and inactive status. The available data do not allow us to specifically identify registered nurses who were not currently working as a nurse (or had an inactive license) at one point in time and then decided to work as a nurse (or made their license active) at a later point in time. Despite this limitation, the cross-sectional trend during the 1990s suggests that there was movement from the inactive pool of registered nurses to the active pool. One implication of such movement is that during times of a tight labor market, employers can look to the inactive pool of nurses for additional labor in the short run. Analysis of micro-level, longitudinal data on registered nurses would allow us to better estimate the extent of movement between the pool of nurses with an inactive license/not working as a RN and the pool of nurses with an active license/working as a RN.

Figure 6: Number of RNs Licensed in California, 1990 to 2001



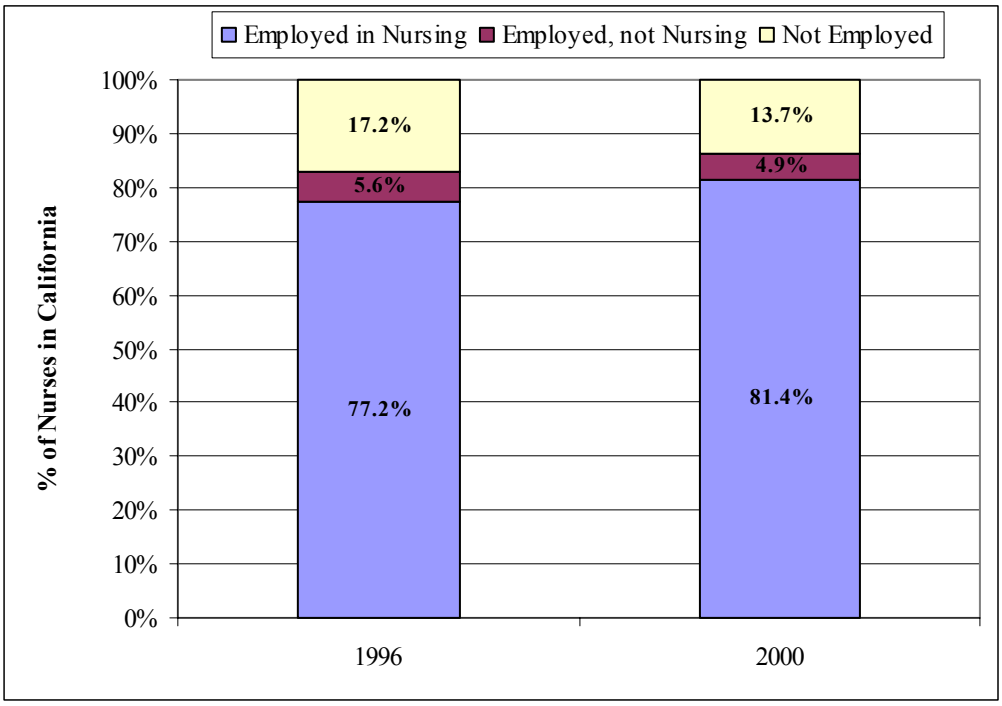
Source: California Board of Registered Nursing.

Figure 7: Active License Status of RNs, 1990 to 2001



Source: California Board of Registered Nursing.

Figure 8: Employment Status of RNs in California



Source: National Sample Survey of Registered Nurses, 1996 and 2000.

Demographic characteristics of California's nurses

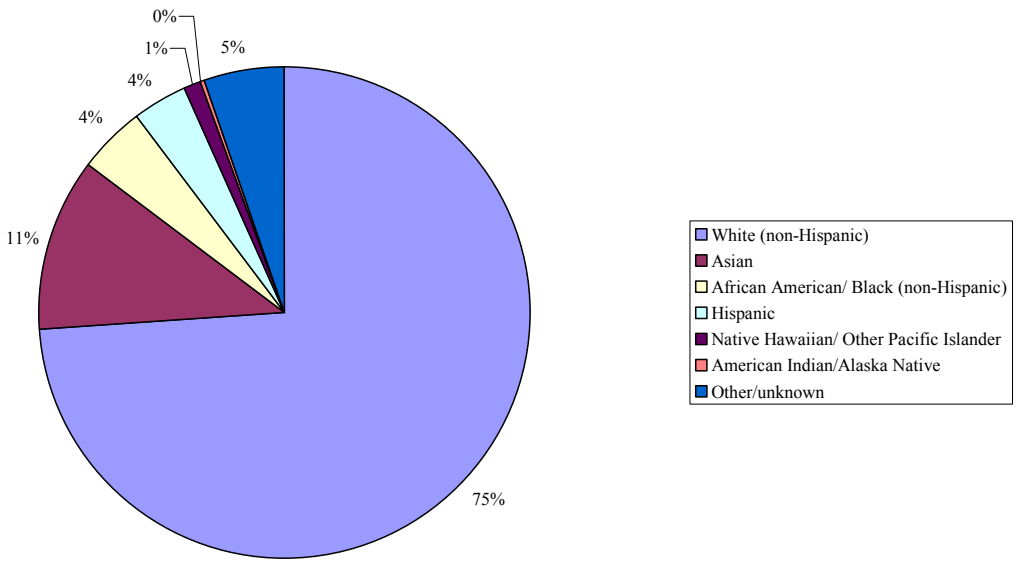
Little is known about California's LVN workforce, because there are no national or statewide surveys of LVNs. The Bureau of Health Professions, in the United States Department of Health and Human Services, has contracted with the NWI evaluation team at the University of California, San Francisco, to conduct a national study of the LVN/LPN workforce. Findings from this study will be published in 2004.

California's RN workforce predominantly consists of white women. This mirrors the national RN workforce, although newly graduating nurses in the United States are more likely to be nonwhite or male. Approximately 7 percent of California RNs were males and 93 percent are female in 2000. In 1996, approximately 5 percent of all RNs in the U.S. were male while 7 percent of California RNs were male. Figure 9 presents the racial and ethnic mix of nurses in California in 2000, according to the National Sample Survey of Registered Nurses, conducted by the United States Bureau of Health Professions. In 2000, about 74 percent of California's RNs were white, while only 47 percent of California's total population was white that year (California Department of

Finance, 2003). Asians comprise the largest non-white group of RNs in California, at 11 percent of the State's RN workforce. Slightly over four percent of the RN workforce is Black. Only 3.6 percent of the State's RN workforce is Hispanic, which is well below the 32 percent of the overall population that is Hispanic (California Department of Finance, 2003).

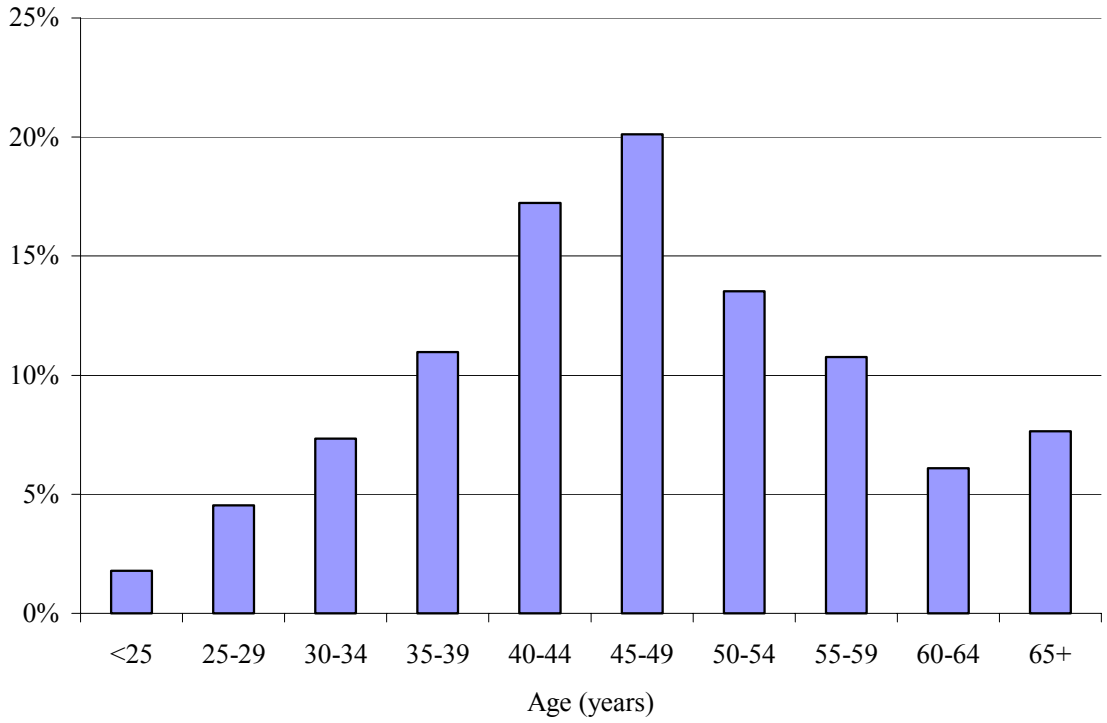
Figure 10 presents the age distribution of California's RN workforce. Less than 25 percent of the State's RNs are under 40 years of age, and 13 percent are older than 60 years. Overall, 81 percent of California's RNs are employed in nursing (Figure 8), but the likelihood of a RN working in nursing declines with age (Figure 11). Over 45 percent of nurses over age 60 do not work as nurses, while only 10 percent of nurses under age 30 do not work in nursing.

Figure 9: Racial and Ethnic Background of California's Registered Nurses



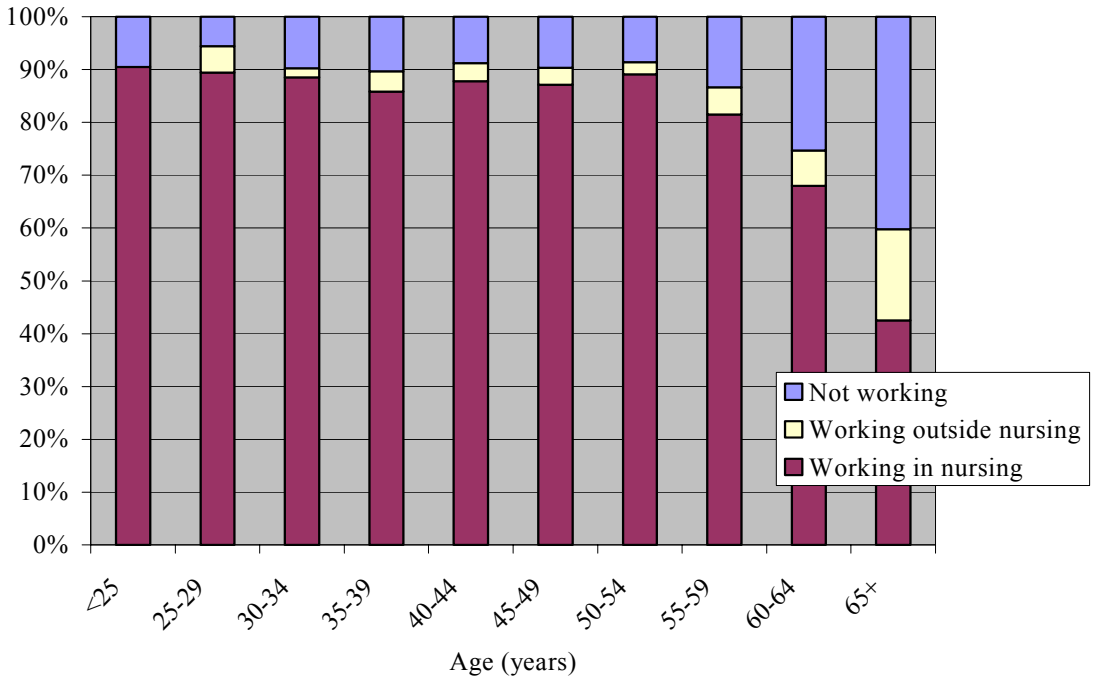
Source: U.S. Bureau of Health Professions, National Sample Survey of Registered Nurses, 2000

Figure 10: Age Distribution of California RNs, 2000



Due to rounding, percentages may not add to 100%.
Source: U.S. Bureau of Health Professions, National Sample Survey of Registered Nurses, 2000

Figure 11: Employment Status of California Nurses, by Age



B. The Flow of Nurses into California's Supply

The stock of California nurses increases with three sources of new nurses: (1) California-educated individuals, (2) people migrating from other states into California, and (3) people migrating from other countries into California. California's dependence on each of these sources changed during the 1990s. Overall, the number of new licenses issued to registered nurses was fairly stable from 1992 to 1999—fluctuating between 10,000 and 12,000 per year. Since 2000, however, the number of new RN licenses increased significantly (see Figure 12).

The increase in new registered nurses appears to be driven by an increase in the number of nurses coming from other states. Figure 13 displays the percent of new licenses issued by the source of education. The percent of new licenses issued to those educated in California declined each year from 1996 to 2001, while the percent getting a California license from out-of-state endorsement increased every year (with the exception of 1999). By 2001 out-of-state endorsements accounted for roughly 55 percent of the new licenses issued. The greatest change occurred between 1999 and 2000, when the percent of new licenses going to those educated in California dropped from about 42 percent to 32 percent.

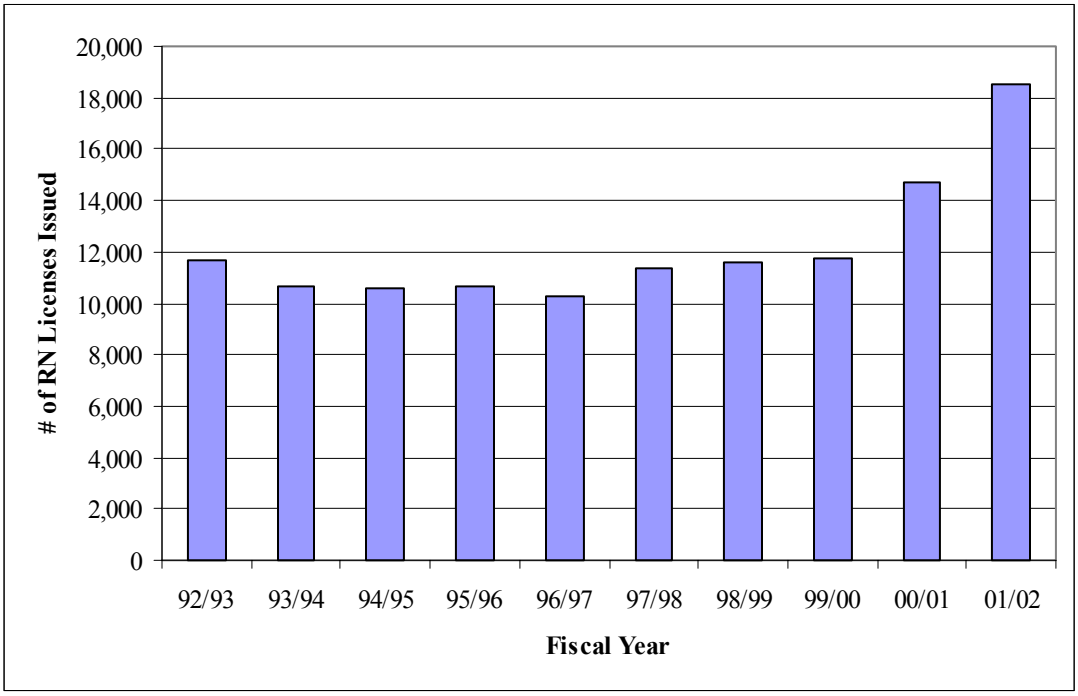
An examination of the number of graduates from California RN programs confirms the decline in California-educated nurses from 1994-95 to 1996-97. The number of RN program completions was relatively stable between 1997-98 and 1999-2000, with a small increase between 1999-2000 and 2001-02 (see Figure 14). Some of the out-of-state nurses who obtained licenses in California in recent years may be traveling or temporary nurses, who are not permanent residents of California. Nonetheless, these nurses contribute to the stock of nurses available for work in the State.

The percent of new licenses going to internationally educated nurses was fairly stable during the 1990s but increased by 2001. From 1996 to 2000 about 10 percent of new licenses went to internationally educated nurses. By 2001 that percentage increased to about 13 percent (see Figure 13). As more years of data become available we will be able to determine if this increase is an anomaly or the beginning of a trend. The number of registered nurse immigrants admitted to the United States declined drastically in the 1990s (see Figure 15), after increasing throughout the 1980s. As with the trend in new

licenses going to those educated outside the U.S., however, the number of registered nurse immigrants increased at the beginning of 2000.

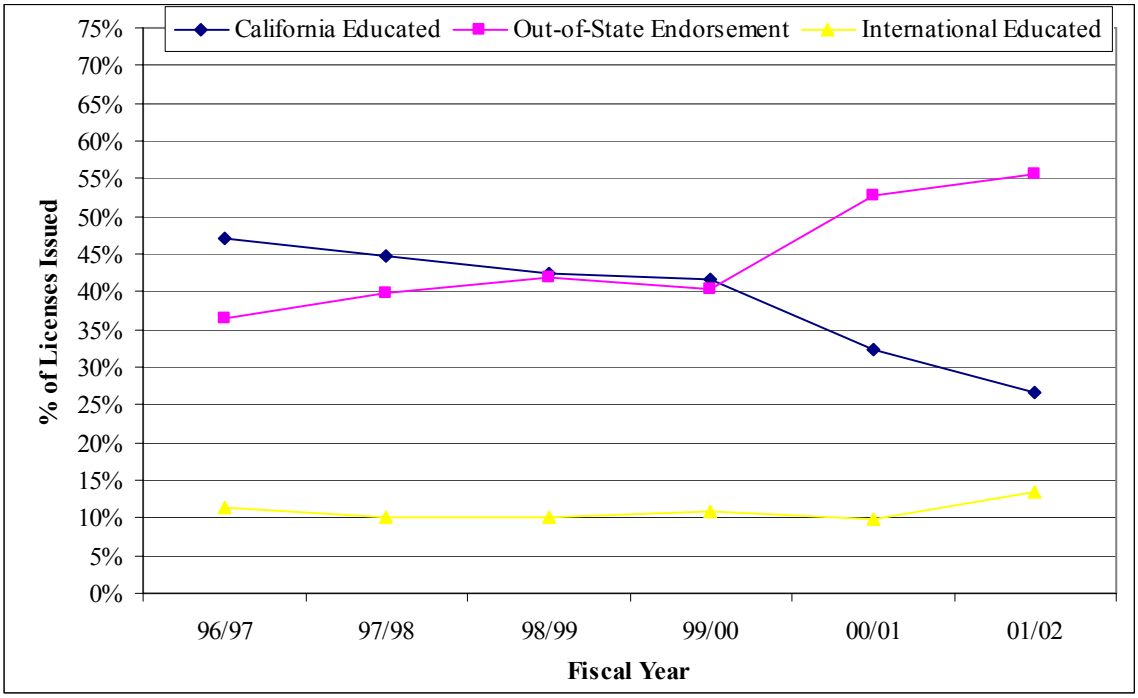
The shift from California-educated sources of registered nurses to out-of-state sources suggests that in a tight labor market California has looked to import labor in the short run. As discussed below, California's ability to increase its "domestic" production of registered nurses is constrained in the short run by the capacity levels of California's education system and the time lag associated with education and training.

Figure 12: Number of RN Licenses Issued in California, 1992 to 2001



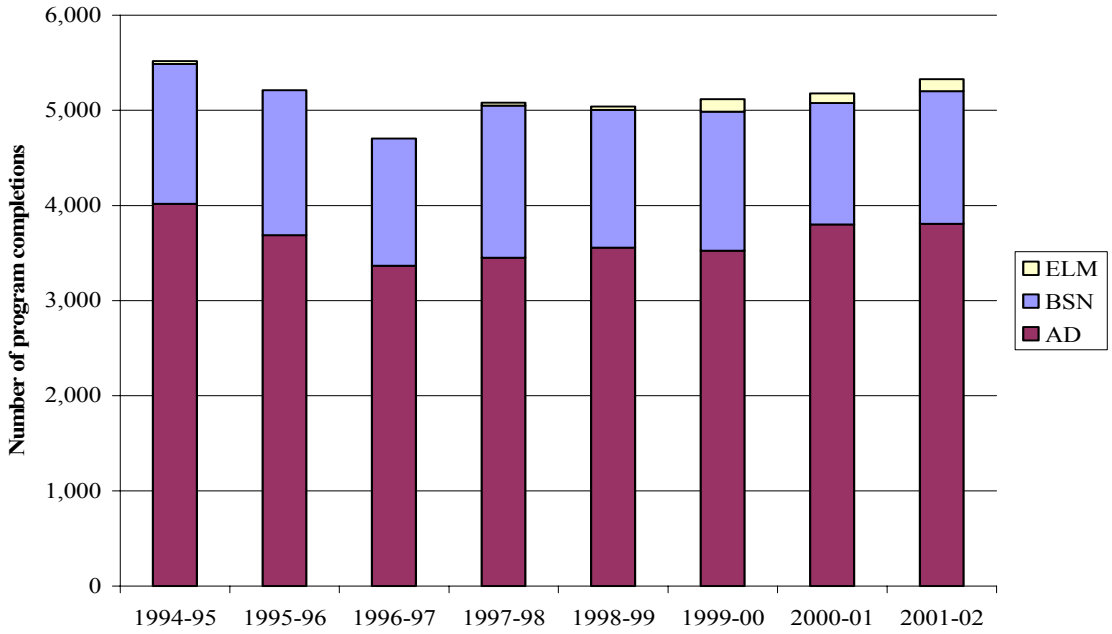
Source: California Board of Registered Nursing.

Figure 13: California RN Licenses Issued by Source, 1996 to 2001



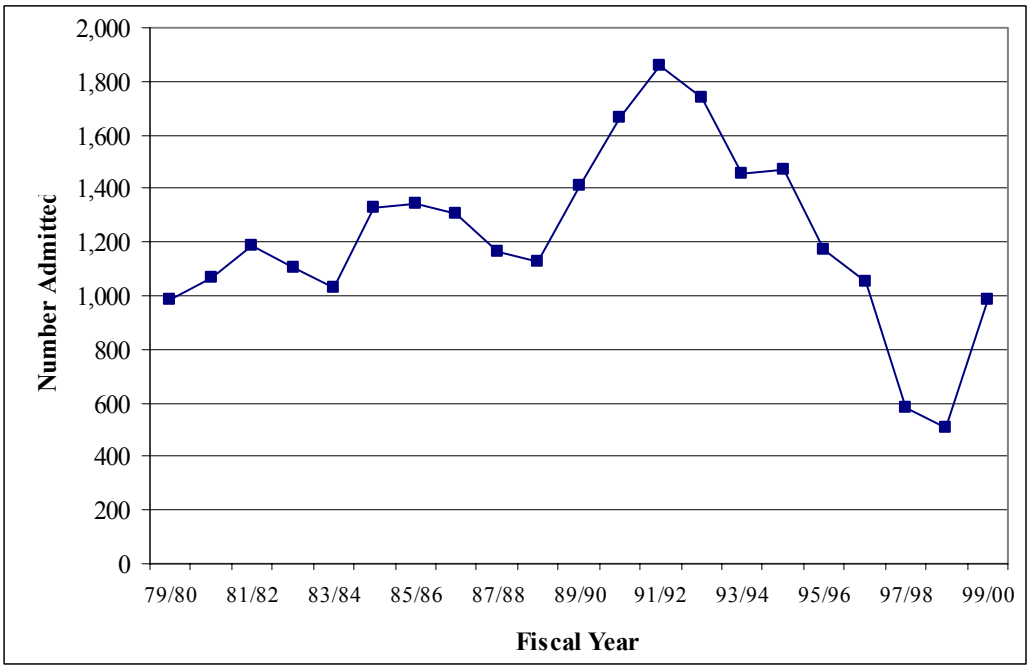
Notes: The percentages for a given year do not add to 100 percent because smaller sources are excluded from the figure, such as out-of-state educated individuals taking the RN exam in California.
Source: California Board of Registered Nursing

Figure 14: Number of Graduates from Registered Nursing Programs



Source: California Board of Registered Nursing.

Figure 15: Nurse Immigrants Admitted to California, 1979 to 1999



Notes: Number of registered nurse immigrants reflects the number of immigrants admitted to the U.S. as legal permanent residents that reported registered nurse as their occupation and reported California as their intended state of residence. For FY 82/83, data on occupation were not reliable, so we estimated the number admitted based on the numbers in the previous and subsequent years.
Source: Immigrants Admitted to the United States, Immigration and Naturalization Service, U.S. Department of Justice, annual files (1980-2000).

Occupational Choice In the U.S. Economy

Growth in the domestically-educated nursing workforce begins with interest in the nursing profession. For the first part of the 20th century, licensed nursing was one of a few occupations widely open to women. Most women faced limited career choices, and nursing was an attractive option to women who were interested in science. As career opportunities expanded for women in the second half of that century, however, nursing had to compete with numerous other attractive professions for new entrants. It has been suggested that women now are less likely to choose a traditionally female-dominated career such as nursing (Buerhaus, Staiger, and Auerbach, 2000). However, an annual survey of 350,000 first-year college students across the U.S. found that the percent of students planning on a career in nursing remained steady at five percent between 1966 and 1996 (Astin, 1998).

Several factors affect interest in the profession of nursing. Perhaps foremost is the image of nursing relative to that of other professions. In the 1990s, nursing's reputation suffered, as nurses complained about low staffing levels, diminished pay, and poor working conditions (Buerhaus and Staiger, 1999). In response to concerns that the declining image of nursing would contribute to long-term nursing shortages, several efforts were launched to attract people to the nursing profession. The most visible of these campaigns has been that of the Johnson & Johnson Corporation, which has produced television commercials and advertising posters and distributed them nationally. Johnson & Johnson also has hosted fundraising events for student scholarships and nurse faculty development. Other, more localized efforts have involved the development of web pages to promote nursing and provide information for prospective students about educational opportunities (Coffman, Spetz, Seago, et al., 2001). One example of this is the Coalition for Nursing Careers in California (CNCC), an organization formed by health care providers and educators. CNCC has actively promoted nursing in California through its web site (www.choosenursing.com), posters, flyers, and "Nurse Ambassador" program, which provides resources for nurses to promote the occupation at local schools and career fairs.

The salaries of nurses relative to other professions also affect the flow of students into nursing (Spetz and Given, 2003). In the mid-1990s, nursing wages in California did not keep pace with inflation (Spetz, 1998; Spetz and Given, 2003), and declined relative to other professions. In general, when the economy is growing and wages are rising in other fields, nursing schools observe declines in applications (Spetz and Given, 2003). During recessions, when nursing wages are relatively high and unemployment rates for nurses are low, interest in nursing schools grows. Over the past few years, substantial growth in starting RN wages have been reported: inflation-adjusted median RN wages increased 13 percent between 1997 and 2000, and starting RN wages increased 5.7 percent between 2000 and 2002 (Robinson, 2002; U.S. Bureau of Labor Statistics, various years). There has been a concordant rise in enrollments in nursing schools (Maher, 2003).

Over the past several decades, the average age at which RNs complete their basic nursing education has been steadily increasing. In 1988, the average age at graduation

was 23 years; in 1996 it had increased to 33 (Wunderlich et al., 1996; U.S. Bureau of Health Professions, 1996). In addition, a greater proportion of registered nurse students is entering nursing programs with a non-nursing, post-high school educational degree (U.S. Bureau of the Health Professions, 1996). In other words, nursing appears to have become more attractive as a "second career" and less attractive to students completing high school.

Nursing Education and Licensure in California

- **Licensed Vocational Nursing Education**

California's 87 LVN education programs are found in five different settings. There are 42 community college programs in the State, 14 adult education programs, 23 private school programs, 6 programs in regional health occupation centers and high schools, and one hospital program. These programs require 12 to 14 months of full-time study or 18 to 20 months of part-time study to complete. The programs include both didactic (classroom) education and clinical education, with clinical education occurring in hospitals, nursing homes, and other clinical settings.

The basic LVN license in California does not allow LVNs to start intravenous drips or draw blood. A LVN must demonstrate competency in these tasks to receive special certification to perform them. Classes are offered to fulfill the requirements, and often the material is combined into a single class. Some LVN education programs include this additional coursework in their curriculum, while other programs require the student to pursue additional education after licensure.

Many of California's LVN programs are accredited by the National League for Nursing or another accreditation board. Accreditation by a national organization is not required by the California Board of Licensed Vocational Nursing and Psychiatric Technicians (BLVNPT), which approves all LVN programs in California. The BLVNPT also approves faculty who teach in LVN programs. Faculty must have a minimum of a baccalaureate degree in nursing and an active RN license. The BLVNPT prefers that faculty have master's degrees.

LVN programs vary widely in cost, with adult school, regional health occupation center, and community college programs charging no or nominal tuition, and private

schools charging thousands of dollars. Financial aid is available through a variety of federal and state programs, and schools actively assist students in obtaining grants and loans. The most significant cost to a student in a publicly-funded LVN program is the time the student must take away from paid work to pursue education. This short-term "opportunity cost" can be significant, but the relatively high earnings of LVNs outweigh this cost in the longer term.

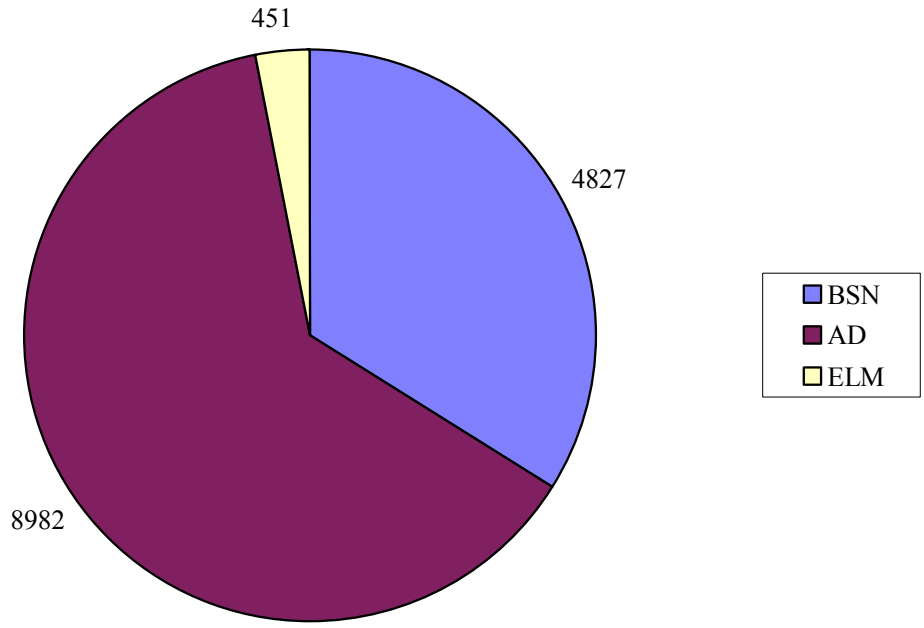
The Board of Vocational Nursing and Psychiatric Technicians is now surveying accredited programs in the State to learn about their applications, admissions, and graduations. Anecdotal reports suggest that many LVN programs have more applicants than space available (personal communication, Cindy Collier, Bakersfield College), but no statewide survey has been conducted to confirm whether there exists a shortage of slots in LVN programs.

- **Registered Nursing Education**

Pre-licensure education

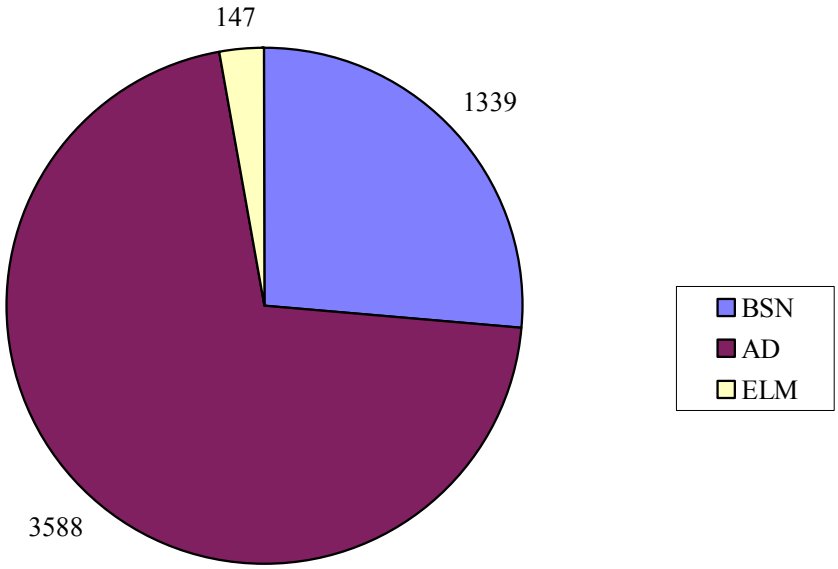
Registered nursing education programs fall into two categories: pre-licensure, taken before licensing as an RN, and post-licensure. In California, 100 programs prepare students at the pre-licensure RN level, 72 of which are associate degree (AD) programs. The baccalaureate of science in nursing (BSN) is offered by 23 programs, and five programs offer an entry-level master's (ELM) degree in nursing. California has no diploma programs in nursing; these programs have been on the decline throughout the United States for the past fifty years. Only 15 entry-level RN education programs are in private colleges; the rest are in community colleges, the California State University system, and the University of California system. RN education programs are independent of each other, and they have different prerequisites, graduation requirements, and curricula. In the 2001-2002 academic year, 14,260 students were enrolled in California RN pre-licensure programs (California Board of Registered Nursing, 2003). Figure 16 presents the total enrollments in RN programs in the 2001-2002 academic year by type of program, and Figure 17 presents graduations by type of program. Figure 18 provides total enrollments over time; as seen in this figure, there has been a significant increase in the number of enrolled nursing students over the past five years.

Figure 16: Total Enrollments by Type of RN Program, 2001-2002



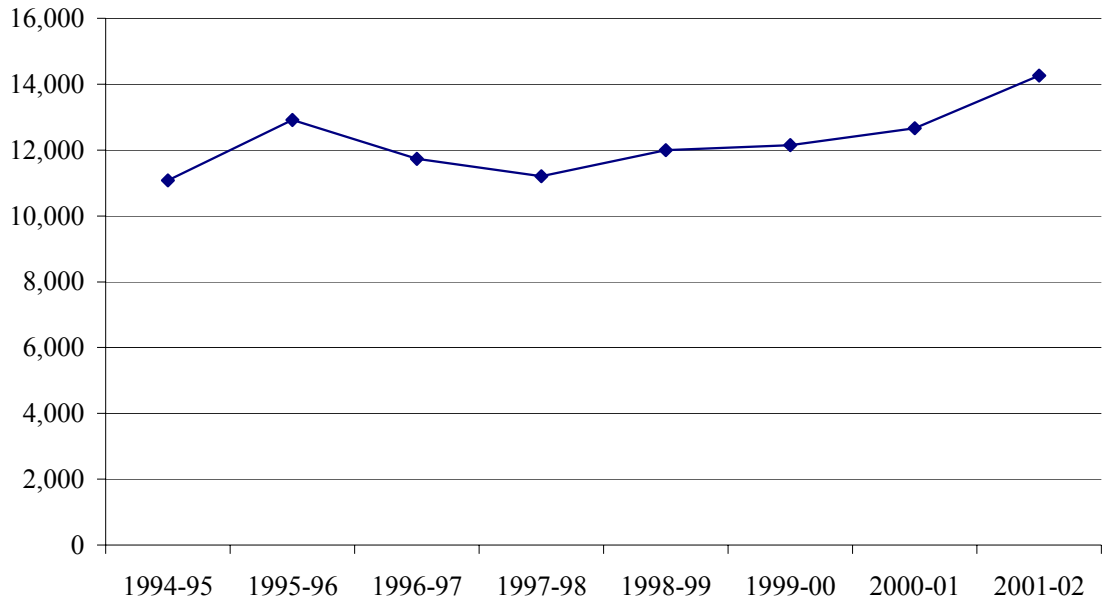
Source: California Board of Registered Nursing, 2003.

Figure 17: Graduations by Type of RN Program, 2001-2002



Source: California Board of Registered Nursing, 2003

Figure 18: Total Enrollment in California RN Programs, 1994-95 through 2001-02



Source: California Board of Registered Nursing

RN education is similar to LVN education in that it includes both didactic and clinical components. All pre-licensure registered nursing programs in California are approved by the Board of Registered Nursing (BRN). The BRN also approves all faculty who teach in RN education programs. Regular faculty must have a master's degree in nursing, although a PhD is preferred. For clinical education, assistant instructors must have a baccalaureate degree in nursing or higher education, and clinical teaching assistants can be any RN.

Associate degree pre-licensure programs often are dubbed "two-year nursing programs," but this characterization is false (Seago and Spetz, 2003). AD programs require anywhere from 36 to 63 semester units for completion, after matriculation to the program. In order to be admitted to an AD program, a student must pass 4 to 27 units in prerequisite subjects such as biology, chemistry, anatomy, mathematics, and English. One to two years of study are thus required before entry into nursing education, leading to a total of three or more years to complete the AD in nursing.

A small number of students pursue an option to take the nursing board exam in California after completing 30 units of nursing coursework. This option does not lead to a degree in nursing, and licenses granted under this option are not transferable to other states. Only 54 of the 5,327 students who completed nursing programs in the 2001-2002 academic year took this option (California Board of Registered Nursing, 2003).

At the present time, California's community college nursing programs are attempting to standardize prerequisites to their programs, as requested by Assembly Bill 2314 (Chapter 1093, Statutes of 2002). This is likely to be a difficult process, because there are a large number of programs that must agree to prerequisite standards, and each of these programs must negotiate with core science departments at their colleges to offer the types of prerequisite courses needed by the nursing programs.

Baccalaureate pre-licensure programs in nursing are designed to last four years, but some students require more than four years to complete the programs because they have difficulty enrolling in all the required courses at overcrowded campuses. BSN programs include the same curricula as do AD programs, with the addition of upper-division nursing courses such as public health, epidemiology, research methods, community health, and nursing theory. In addition, BSN students must complete all the general education requirements associated with baccalaureate education.

Public colleges and universities play an important role in RN education. Sixty-nine of the AD programs and 14 of the BSN programs are in publicly-funded institutions, educating 86 percent of California's RN graduates. While tuition in private RN programs costs many thousands of dollars per year, tuition in community colleges is $18 per unit and in the California State University system tuition and fees are about $2,400 per year. Thus, public colleges and universities provide an affordable opportunity for students to obtain nursing education.

Post-licensure education

Some schools offer educational programs for students already licensed as vocational nurses who want to obtain RN licensure. LVN-to-RN programs are usually found in community colleges, although some are offered by private and baccalaureate colleges. Some LVN and RN programs are designed to work together, so students can

obtain their RN license after an additional year of study. However, such seamless articulation is not universal; some LVNs must complete nearly the entire basic RN curriculum in order to become a RN. In general, vocational LVN programs do not result in a student having many credits to bring to a RN education program, whereas community college LVN programs are designed to articulate to the same college's RN program. According to the 2000 National Sample Survey of Registered Nursing, about 11 percent of California's RNs were previously licensed as LVNs or LPNs.

Approximately 26 percent of RNs in California received additional educational degrees after completing their primary nursing education (U.S. Bureau of the Health Professions, 2000). RNs with associate degrees can pursue a BSN through RN-to-BSN programs. These programs are offered at California State University campuses, private colleges, and University of California, Los Angeles. Some AD programs have agreements with BSN programs, so a large share of course credits received during AD education can be transferred into the BSN program. However, as with LVN-to-RN education, such articulation is not universal. Articulation agreements usually exist within regions of the State, but students who move from one part of California to another might have difficulty transferring their course credits.

Graduate education in nursing consists of the master's degree in nursing (MSN) and the PhD in nursing. These programs offer nurses specialized education in clinical, educational, and management fields. Master's degrees programs include fields such as nurse practitioner, certified nurse midwife, education, nursing administration, and informatics. After completion of some of these programs, a student may take an exam to obtain certification in a specialized field. The Board of Registered Nursing approves certification programs for nurse anesthetists, nurse-midwives, nurse practitioners, public health nurses, and various clinical nurse specialties.

Doctoral nursing programs are available in many of the same fields as are master's programs, but they emphasize research and require completion of a doctoral dissertation. Nurses who pursue doctoral education typically work as faculty or in top nursing administrative roles. Nationwide, only 0.3 percent of nurses have a PhD in nursing.

Master's degrees in nursing are offered by 15 California State University campuses, 12 private universities and colleges, and four University of California campuses. Many of these programs are for nurse practitioner certification. Only two schools offer the Ph.D. in nursing: UCSF and UCLA.

Because post-licensure education does not involve receipt of a new nursing license, there is no centralized source of information about what share of nurses pursue post-licensure education in California. The public-use data from the National Sample Survey of Registered Nurses does not provide detailed information about additional degrees survey respondents received after completing their basic education, so we cannot tabulate these data for California nurses. Nationwide, about 10 percent of nurses whose basic education was the AD report a highest education level of BSN. Another 3.2 percent received a MSN. Fourteen percent of nurses whose primary education was the BSN received a MSN (U.S. Bureau of the Health Professions, 2002).

- **Overcrowded Nursing Programs**

Most nursing education programs cannot admit all qualified applicants due to space limitations (Coffman et al., 2001; CA Board of Registered Nursing, 2003). In 2001-2002, 81 percent of nursing programs had more applicants than spaces. In that academic year, California nursing programs received 10,362 applications for admission to nursing programs, but had only 6,719 slots available for new admissions, and 6,305 slots were filled. Programs that were oversubscribed were not able to accommodate 4,141 applicants. The programs that had slots available for students could have accommodated only an additional 158 students. It is not known how many students were unable to find a slot at *any* campus. The count of 4,141 unaccommodated applicants is not unduplicated; some individuals appear in this count multiple times, if they applied to and were not accommodated by multiple programs. Some of the applicants who did not find space at one campus (and thus are counted as unaccommodated) may have found space at another campus.

Community college associate degree programs had 7,288 applicants for 4,538 slots. They were unable to accommodate 2,977 applicants and could have enrolled 87 additional students. Private associate degree programs received 266 applicants for their 240 slots; these programs do not face the surplus of applicants encountered by less-

expensive community colleges. California State University nursing programs received 1,509 applications and had 1,109 slots for new admissions. 502 applicants were rejected, and 42 additional slots could have been filled in the system. Private BSN programs had 904 more applications for 642 slots, and only 11 more students could have been enrolled. Entry-level master's programs had 395 applicants for 190 slots. No additional students could have been enrolled in these programs.

Some schools have open slots for nursing students because they do not receive enough qualified applications. There is no centralized system for admission to nursing programs in California; thus, there is no mechanism through which a student can learn of open slots in programs across the State. Of the 77 entry-level registered nursing programs that reported that their admissions were restricted, 62 said the reason was limited funding.

Qualification for entry into a nursing program is based on standards established by the program. These standards vary by type of program and by campus. Private colleges can establish their own admission requirements, and these vary widely. Public college and university nursing program applicants must pass a selected set of prerequisite courses with at least a 2.0 grade point average to be qualified for admission to the program. Because there are more applicants than admission slots, nursing programs must decide which qualified applicants will enter their program.

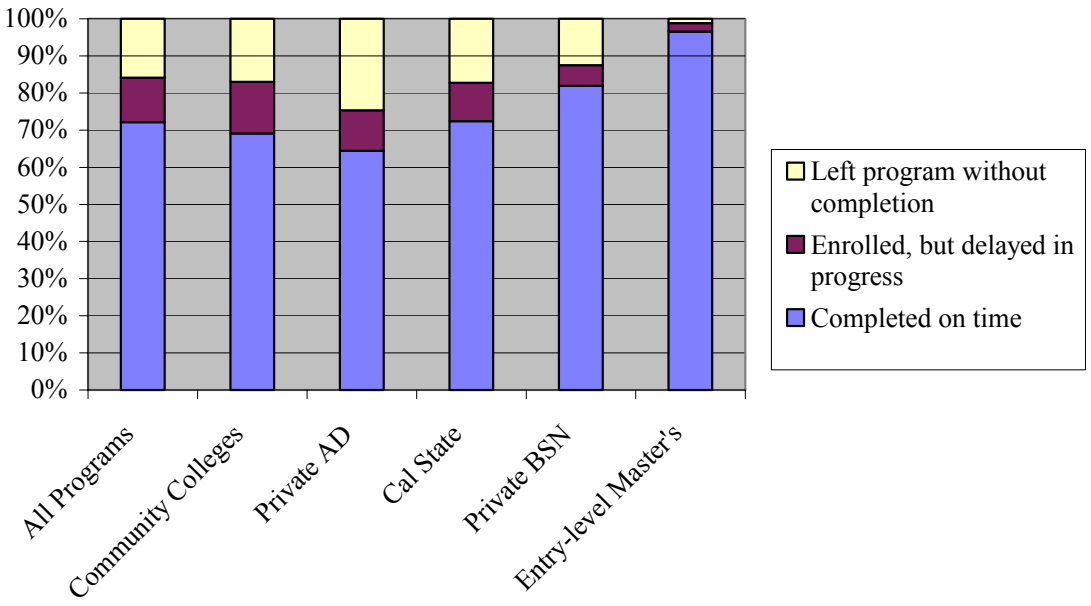
Two strategies can be used to allocate scarce admission slots: choosing the "most qualified" from the qualified applicants ("selective admissions"), or randomly selecting applicants from the qualified applicants. In general private and BSN programs use selective admission strategies, granting priority to students based on grade point averages, test scores, community service experience, or health care experience. In contrast, California's community college system operates under the philosophy that all qualified students should have access to the educational resources of the college (Seago and Spetz, 2003). Thus, most community colleges have developed methods of admission such as waiting lists, lotteries, and enrollments for those who arrive first on registration day. These strategies favor students who are most perseverant and are willing to wait for a slot to become available for them. Some community college nursing programs have

established higher minimum admissions criteria, such as a greater number of prerequisites or a higher grade point average for admission.

- **Completion of Nursing Programs**

California's nursing programs can increase the number of new nurses in two ways. First, they can create new slots in their programs for students so their entering classes are larger. Second, they can increase the share of students they admit who graduate on time and pass the board exam. The Los Angeles Times has reported that some nursing programs have attrition rates as high as 50% (Leovy, 1999). In the 2001-2002 academic year, 82 programs reported to the BRN their on-time completion, delayed progress, and attrition rates for the cohort of students that should have graduated that year (see Figure 18). Overall, programs reported that an average of 72 percent of their students completed their programs on time, with an average attrition rate of 16 percent. However, less than 70 percent of students in AD programs graduated on schedule. California State University RN programs, on the other hand, report a 72 percent on-time graduation rate, and a 17 percent attrition rate. Private baccalaureate programs fare better, with 82 percent graduating on time and 12.5 percent leaving without graduating. The higher tuition costs of private programs are likely to be a significant factor in this difference; students may be more committed to obtaining a RN license given such a large financial investment. Entry-level master's programs boast an on-time completion rate of 96.5 percent, and only one percent of their students quit the programs.

Figure 19: Progress of Students Who Were Scheduled to Graduate from RN Programs in the 2001-2002 Academic Year



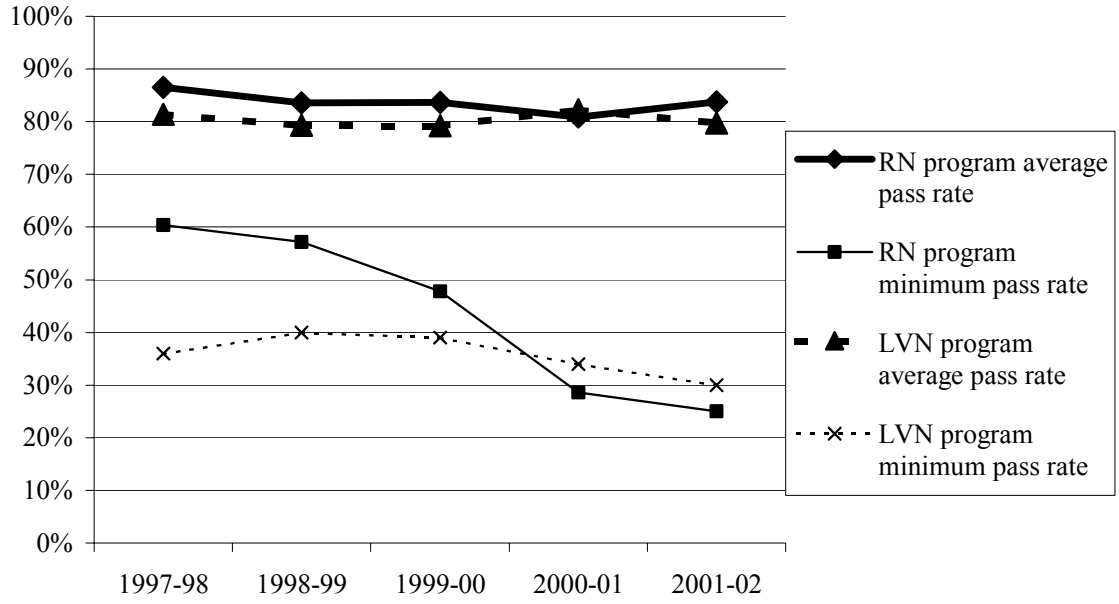
Source: California Board of Registered Nursing, 2003

The Licensure Process

In order to practice as a licensed vocational or registered nurse, a person must first successfully complete the examinations approved by the Boards of Licensed Vocational Nursing and Registered Nursing. In both cases, the required examination is the National Council of State Boards of Nursing Licensing Examination (NCLEX) specific to the license sought. Without passing the NCLEX, one is not a licensed nurse, even if one has completed a nursing program. New graduates can obtain a six-month interim nursing license to practice until they have attempted the exam the first time. If the new graduate does not pass the exam on the first attempt, the interim permit is revoked and the graduate cannot practice until they pass the examination.

First-time pass rates on the Board exams vary widely. As seen in Figure 20, LVN programs had an average 80 percent NCLEX first-time pass rate in 2002 and RN programs had an average first-time pass rate of 84 percent. The lowest pass rate for approved LVN programs was 30 percent, and for RN programs it was 25 percent. Eleven

Figure 20: Average NCLEX First-Time Pass Rates for Nursing Programs in California, 1997-98 through 2001-02



Source: California Board of Registered Nursing and California Board of Vocational Nursing and Psychiatric Technicians

LVN programs and three RN programs had 100 percent pass rates. Over time, average NCLEX first-time pass rates have remained relatively stable. However, there has been a decline in first-time pass rates for the lowest-performing programs. The Board of Registered Nursing and Board of Vocational Nursing and Psychiatric Technicians can consider these data in their decisions to accredit and reaccredit nursing programs.

The most common way of obtaining a license as a vocational nurse is by completing an approved LVN (or out-of-state LPN) education program and passing the NCLEX-PN exam. However, a person can take the Board exam without studying in a LVN or LPN education program. After completing 54 hours of study in pharmacology, obtaining 51 months of paid bedside nursing experience, and demonstrating skill proficiency, the BLVNPT allows a person to take the exam to obtain a license. In addition, former military corpsmen can take the exam after 12 months of active duty experience providing bedside care, completion of the basic course in nursing in the armed forces, and honorable discharge from the military. Under certain circumstances, an individual also may challenge the NCLEX-RN exam. Approval must be obtained from the BRN, however, in order to receive a registered nurse license without completing an approved basic education program.

LVN and RN licenses are renewed every two years in California. In order to renew a license, a nurse must complete 30 continuing education units (CEUs) and pay a renewal fee. Continuing education units are offered by a wide variety of organizations and educational institutions, in subjects ranging from clinical topics to alternative medicine to information about minimum nurse-to-patient ratios. Courses can be taken in a classroom setting, online, or at home. Attendance at some professional meetings and conferences can confer CEUs.

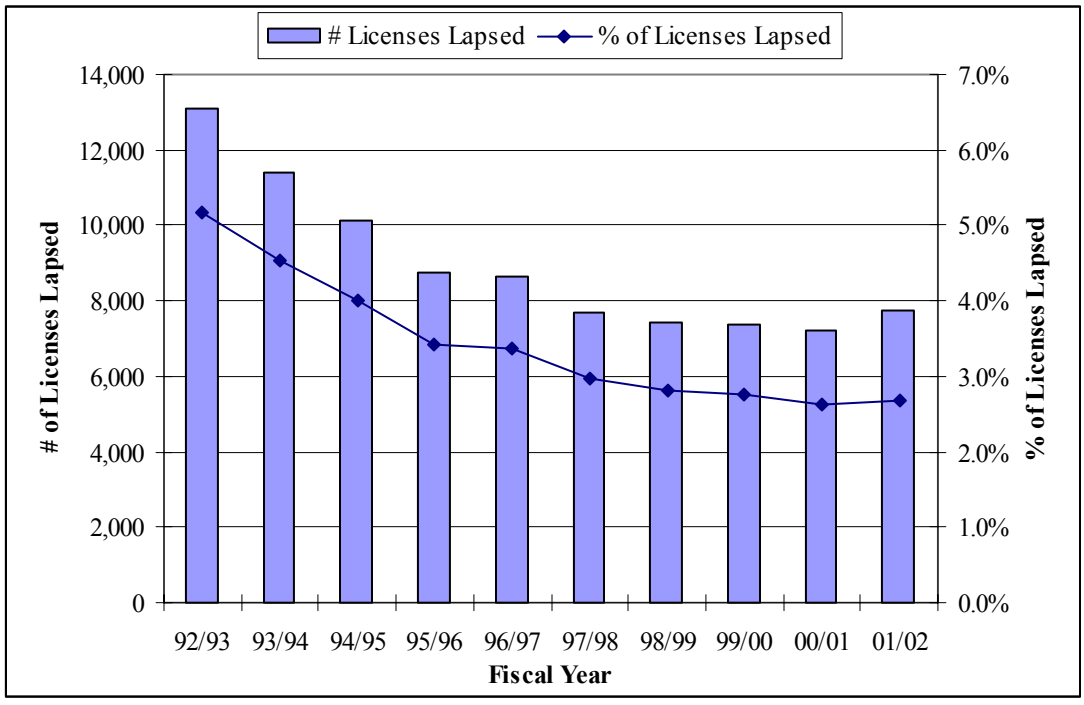
The Boards of Licensed Vocational Nursing and Registered Nursing have the responsibility of ensuring that licensed nurses are practicing according to the laws of the State of California and the standards of the profession. Thus, these Boards receive, investigate, and resolve complaints lodged against individual nurses. Causes for loss of a nursing license include misuse of alcohol, use of illegal drugs, conviction of a crime related to the practice of nursing (such as embezzlement or child abuse), and inappropriate patient care. Nurses undergoing disciplinary action are listed in the

Boards' newsletters and this information is made available to their employers and the public.

C. The Outflow of California Nurses

California's nursing labor supply declines as nurses allow their licenses to lapse. Nurses may choose to not renew their licenses for a variety of reasons. They may move out of California, and remain in the national nurse labor supply. They may retire, which represents a permanent movement out of nursing. Some nurses choose to work in another occupation; although many nurses who do this maintain their nursing license, some expect this to be a permanent change and stop renewing their licenses. Some LVN licenses lapse because the license holder completes an RN education program and is subsequently licensed as a RN.

Figure 21: Number of RN Licenses Lapsed in California, 1992-93 to 2001-02



Notes: The number of licenses lapsed each year is calculated by subtracting the number of new licenses issued each year from the net change in the overall number of licenses each year. The percent of licenses lapsed each year is calculated by dividing the number of licenses lapsed by the total number of licenses in that year.
Source: California Board of Registered Nursing

The number of registered nurses who let their license lapse decreased during the 1990s (see Figure 21). However, the number of licenses lapsed appears to have leveled off around 7,000 annually by the late-1990s. Given the much publicized discussion of the aging nursing workforce, one would expect the number of lapsed licenses to increase over time, so the observed leveling warrants further investigation. The trend suggests that certain forces (possibly economic or demographic) decreased the number of people leaving the nursing stock in the mid-1990s, but those forces did not dominate in the late-1990s. A more detailed analysis of micro-level data—as opposed to the cross-sectional overview presented here—would allow us to better understand the dynamics underlying this trend.

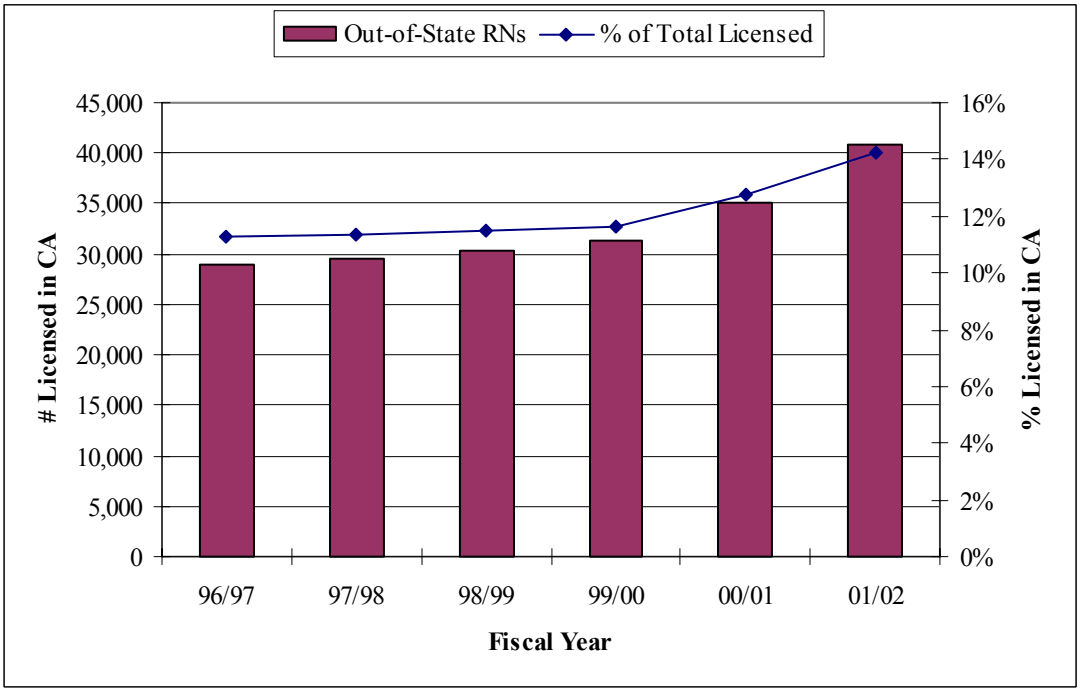
Aging is perhaps the most publicized type of movement out of the nursing labor force. Analysis of the 1996 and 2000 National Sample Survey of Registered Nurses (NSSRN) indicates that California is losing a significant number of nurses to retirement. Figure 22 displays the age distribution of registered nurses in California for 2000 and a simulation of what the distribution would be in 2000 if there were no inflow and outflow of nurses since 1996. The difference between the 2000 and 1996 adjusted distribution represents an estimate of the number of nurses lost or gained in each age category. The simulation shows an increase of younger nurses—likely due to higher migration rates among younger people, thus reflecting the increase in out-of-state nurses—and a decrease in older nurses. For the 60 and over category this difference equates to a loss of approximately 10,000 nurses in California between 1996 and 2000, most of which is likely due to retirement.

Just as migration into California accounted for an increasing number of people flowing into California's stock of nurses, migration out of California accounts for an increasing percentage of nurses flowing out of the stock. One indicator of this outflow is the number and percent of people who hold a license to practice as a registered nurse in California but live outside California, as shown in Figure 23. This number represents both nurses who have chosen to move outside California and nurses who obtain a license in California to work here temporarily, but maintain a permanent residence outside the State. Both the overall number and percent of these nurses increased from 1996 to 2001,

Figure 22: Simulated Change in the Number of RNs through Workforce Aging

Notes: The 1996 adjusted numbers are based on a simulation of what the age distribution would be in 2000 if there were no inflow and outflow of nurses since 1996.
Source: National Sample Survey of Registered Nursing, 1996 and 2000.

Figure 23: Number of California Licensed RNs Living Out-of-State, 1996 to 2001



Source: California Board of Registered Nursing

with the most dramatic increases occurring after 1999. By 2001 approximately 40,000 (or 14%) of California licensed registered nurses lived out-of-state.

D. Supply Responses and Changes

Figure 24 summarizes the expected supply responses of different sources of labor based on the above analysis and economic theory. The responses are grouped into short-run, medium-run, and long-run changes. The expected responses for each source of labor are very general due to the nature and extent of data available at this time. We will be able to expand upon the knowledge of supply responses if additional data are made available.

Figure 24: Summary of Supply Responses and Changes by Source of Labor

Supply Response	California Education System	Pool of Inactive CA Nurses	Pool from Other States	International Pool
Short-run (< 1 year)	Minuscule response: possible change in completion/ graduation rates	Likely minimal response: small percentage of nurses are inactive	Modest wage/bonus response	Minimal response: fixed by current immigration policy but possible change in # of test takers from pool
Medium-run (1 to 4 years)	Modest, but lagged response: constrained by capacity limits (near or at capacity the past few years)	Unknown	Unknown	Modest response: based on CA economic conditions relative to international economies and targeted use of work visas
Long-run	Based on attractiveness of nursing occupation and changing opportunities in other occupations	Tied to overall flow of nurses	Based on relative attractiveness of California as a residential location	Based on changes in immigration policy
Overall Change	Dominated by long-run forces	Dominated by short-run	Dominated by short-run	Dominated by medium-run

V. Labor Market Outcomes

A. Employment Levels for the California Nursing Workforce

Available statistics on employment levels of nurses in California are not sufficiently consistent to document a clear, unambiguous picture of changes over time. The data sources focus either on specific sectors of the economy, contain cross-sectional data for non-consecutive years, or have a sampling framework that makes year-to-year comparisons unreliable. Nevertheless, analysis of the available data on nurse employment levels provides a broad understanding of the nursing labor market outcomes.

The Occupational Employment Statistics Survey (OES) provides annual estimates of employment and wages. Table 1 reports the number of registered nurse (RN) and licensed vocational nurse (LVN) jobs identified by the OES from 1998 to 2001. One advantage of the OES is that it is conducted in every state, thus allowing for comparisons between California and the nation. The survey is conducted annually, but according to the California Employment Development Department (EDD), the United States Bureau of Labor Statistics advises against using the OES as a time series because the data are collected in three year cycles (in California about 37,000 establishments are surveyed each year, taking three years to fully collect the sample of approximately 113,000 establishments).[2] Furthermore, the 1998 survey (marking the end of a three year cycle) used a different occupational classification system than the 1999 to 2001 surveys—thus complicating comparisons from one three year cycle (ending 1998) to another three-year cycle (ending 2001). We are still in the process of better understanding the trends in the OES data and determining the reliability of using the data for temporal analysis.[3]

Despite these limitations, we present the annual employment counts from the OES because it is the only data source available that reports nursing employment levels on an

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[2] We currently are in the process of determining whether annual numbers reported from the OES represent a "moving average" across the three year cycle, or represent the numbers based on that year's sample.

[3] For example, we compared the 1998 and 2001 OES employment counts for nurses in Hospitals to the 1998 and 2001 average annual employment levels for nurses in Hospitals reported in the OSHPD financial data. The two data sources suggest different trends; while the OES data shows a four percent increase in nursing employment (RN and LVN combined), the OSHPD data shows a one percent decrease in nursing employment (including nurse assistants). The OES data are more consistent with numbers published by EDD, which indicates a three percent increase in overall hospital employment during this period.

annual basis at an industry, state, and national level. While specific conclusions from these data may be suspect, we can make broad statements about overall employment levels with some certainty. Approximately 200,000 registered nurses and 50,000 licensed vocational nurses are employed in California. A majority of RNs work in hospitals, while about one-quarter of LVNs work in hospitals and another quarter work in nursing care facilities (see Table 2).

While the OES provides information on how many nurses work in California, other cross-sectional data suggests that a significant portion of nursing jobs is part-time. Figure 25 shows the distribution of RN and LVN jobs by employment status (full-time, part-time, or temporary) as reported in the California Cooperative Occupational Information System (CCOIS).[4] The data suggest that only half of RN jobs and two-thirds of LVN jobs are full-time. It is important to note that the CCOIS reports on jobs rather than individuals; thus, one RN with two part-time jobs, but working full-time, would be counted as two part-time jobs.

Two data sources provide an account of employment status from the perspective of individual nurses. Table 3 reports the average number of hours RNs and LVNs work per week based on the Census 2000 Public Use Micro-data one percent sample (PUMS) and the National Sample Survey of Registered Nurses (NSSRN). According to the PUMS, only 27 percent of RNs and 21 percent of LVNs work less than 35 hours per week. Approximately one in six nurses works more than 40 hours per week. The lower number of part-time work reported in the PUMS data relative to the CCOIS data is consistent with the notion that some nurses work more than one job. The NSSRN asks respondents to report the average number of hours per week worked at their principal nursing position. In 2000, 36 percent of RNs worked part-time at their principal job. This percentage is lower than the percent of part-time and temporary jobs reported in the CCOIS, suggesting that some nurses are taking on part-time or temporary jobs in addition to their principal nursing position.

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[4] The CCOIS data are collected annually by sampling establishments in selected California counties. Each year the occupations and firms surveyed change. As a result, the data are not necessarily representative of the State as a whole, and comparisons across years should be made with caution. This makes it very difficult to examine temporal trends in wages, benefits, and hours of work using the CCOIS data. We pooled CCOIS data from 1999, 2000, 2001, and 2002 to improve generalizability.

Table 1: Number of Registered Nurse and Licensed Vocational Nurse Jobs, 1998 to 2001

	1998	1999	2000	2001	% Change ('98 to '01)
Number of RN Jobs					
National	2,027,830	2,205,430	2,189,670	2,217,990	9.4%
California	172,210	224,190	203,390	201,070	16.8%
Hospitals	112,000	124,600	114,640	120,940	8.0%
Doctors Offices/Clinics	14,970	28,750	25,200	21,130	41.1%
Nursing Care Facilities	10,770	11,730	10,750	10,890	1.1%
Home Health Care Services	8,020	7,630	6,120	6,060	-24.4%
Personnel Supply Services	4,690	6,620	6,260	5,540	18.1%
Other	21,760	44,860	40,420	36,510	67.8%
Number of LVN Jobs					
National	673,790	688,510	679,470	683,790	1.5%
California	49,220	55,430	53,040	52,070	5.8%
Hospitals	17,910	15,210	14,270	14,720	-17.8%
Doctors Offices/Clinics	6,270	8,860	6,690	5,050	-19.5%
Nursing Care Facilities	12,580	13,050	13,540	13,710	9.0%
Home Health Care Services	3,240	5,230	5,640	6,840	111.1%
Personnel Supply Services	2,540	2,210	4,090	3,940	55.1%
Other	6,680	10,870	8,810	7,810	16.9%

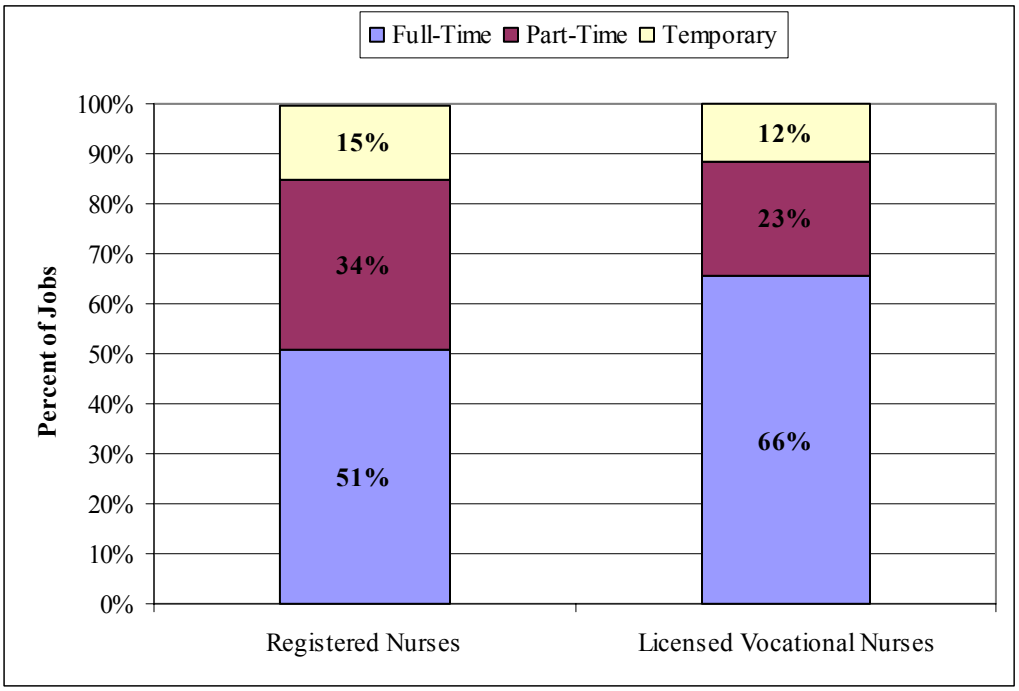
Source: Occupational Employment Statistics Survey, EDD, 1998-2001

Table 2: Industrial Distribution of RN and LVN Jobs, 1998 to 2001

	1998	1999	2000	2001
Distribution of RN Jobs				
Hospitals	65.0%	55.6%	56.4%	60.1%
Doctors Offices/Clinics	8.7%	12.8%	12.4%	10.5%
Nursing Care Facilities	6.3%	5.2%	5.3%	5.4%
Home Health Care Services	4.7%	3.4%	3.0%	3.0%
Personnel Supply Services	2.7%	3.0%	3.1%	2.8%
Other	12.6%	20.0%	19.9%	18.2%
Distribution of LVN Jobs				
Hospitals	36.4%	27.4%	26.9%	28.3%
Doctors Offices/Clinics	12.7%	16.0%	12.6%	9.7%
Nursing Care Facilities	25.6%	23.5%	25.5%	26.3%
Home Health Care Services	6.6%	9.4%	10.6%	13.1%
Personnel Supply Services	5.2%	4.0%	7.7%	7.6%
Other	13.6%	19.6%	16.6%	15.0%

Source: Occupational Employment Statistics Survey, EDD, 1998-2001

Figure 25: Employment Status of RN and LVN Jobs in California



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.
Notes: The percent of RN jobs does not sum to 100 percent because 0.3 percent of RN jobs were reported as seasonal.

Table 3: Average Number of Hours Worked per Week by California Nurses

	Registered Nurses			Licensed Vocational Nurses		
	Overall	Hospitals	Other	Overall	Hospitals	Other
PUMS, 2000						
Less than 35	27.0%	27.4%	26.7%	21.4%	19.4%	23.1%
35 to 40	56.7%	57.9%	52.7%	63.1%	66.8%	59.7%
More than 40	16.3%	14.7%	20.6%	15.5%	13.8%	17.2%
NSSRN, 1996						
Less than 35	33.9%	34.1%	33.4%	n.a.	n.a.	n.a.
35 to 40	60.1%	60.6%	59.2%	n.a.	n.a.	n.a.
More than 40	6.1%	5.3%	7.4%	n.a.	n.a.	n.a.
NSSRN, 2000						
Less than 35	36.0%	36.6%	34.9%	n.a.	n.a.	n.a.
35 to 40	56.7%	55.8%	58.2%	n.a.	n.a.	n.a.
More than 40	7.3%	7.6%	6.9%	n.a.	n.a.	n.a.

Sources: National Sample Survey of Registered Nurses (NSSRN), 1996 and 2000, and Census 2000 Public Use Micro-data Sample (PUMS), 2000.
Notes: For the NSSRN, respondents reported on the average number of hours per week at their principal nursing position. For the 2000 PUMS, respondents reported on the average number of hours per week at all jobs in 1999.

Employment Levels in Key Industries

As seen in Figures 3 and 4, hospitals are the dominant employers of RNs and LVNs in California. Long-term care facilities also are important employers of licensed nurses, particularly for LVNs. The Office of Statewide Health Planning and Development (OSHPD) provides data on staffing levels at California hospitals and long-term care facilities. These data provide the number of "productive hours" worked by RNs, LVNs, and unlicensed nursing assistants, meaning the paid hours less vacation and sick hours. A full-time nurse is typically assumed to work about 1,768 productive hours per year, which is 85 percent of a potential 2,080 hours (40 hours a week for 52 weeks) (Spetz, Seago, Coffman, et al., 2000; Spetz, 2001).

The dominant employers of licensed nurses are hospitals, which employ approximately 23,903 full-time equivalent (FTE) RNs and 10,543 FTE LVNs. Figure 26 presents the average number of hours worked by nursing personnel per hospital in California from 1977 through 2002. The average number of hours worked by RNs in hospitals rose from 1977 to 1993, declined slightly from 1993 to 1996, and grew significantly after 1997. LVN employment in hospitals has declined since 1983, although average LVN productive hours per hospital have been stable for the past five years. The relatively limited scope of practice for LVNs in California is the likely explanation for the decline in their hospital-based employment. The use of aides has risen continuously since 1987, after declining for a decade.

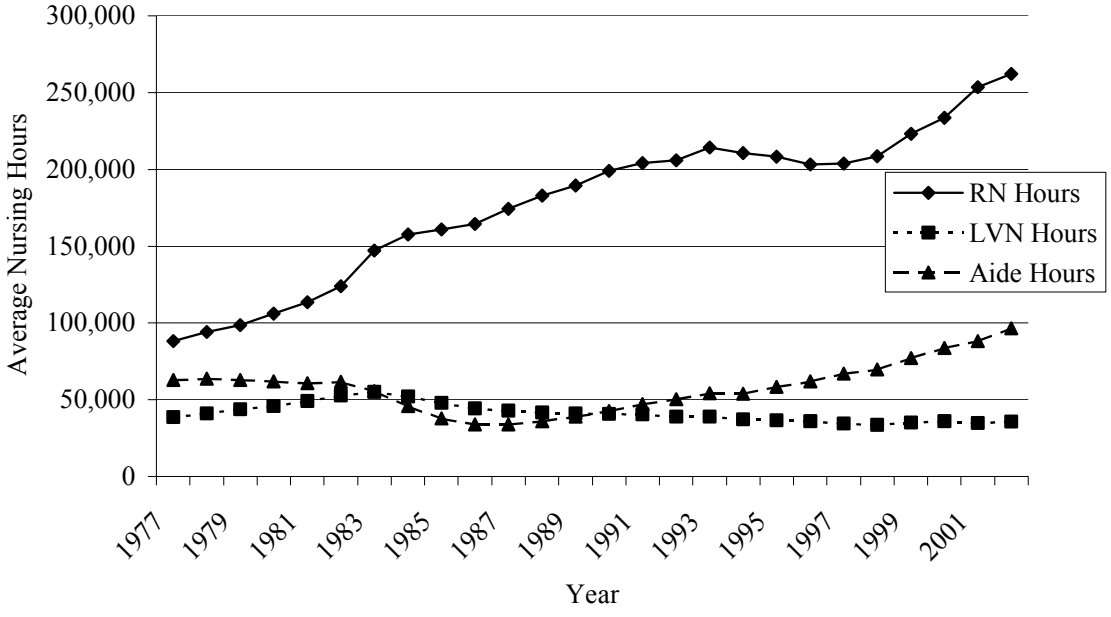
The number of hours worked by nursing personnel can be directly compared with the number of case-mix adjusted patient discharges and days. Case-mix adjusting the number of patient discharges and days controls for variations across hospitals in the illness levels of their patients. For this report, case-mix adjustment was conducted using the OSHPD Patient Discharge Abstracts. Each patient is assigned a Diagnosis-Related Group (DRG), which is a categorization of the patient's diagnosis developed by the federal government for Medicare. Each DRG is given a weight, which reflects the relative cost of that DRG compared to an "average" DRG that has a weight of 1. A hospital's case-mix index is the average of the DRG weights of the hospital's patients. If a hospital has a case-mix index greater than 1, the hospital's patients are sicker than average. Although case-mix adjusting in this way does not fully account for differences

in nursing care needs across hospitals, it is an improvement over unadjusted discharges and patient days.

As seen in Figure 27, the average number of hours worked by RNs per case-mix adjusted patient day rose almost continuously from 1977 through 1992, and has remained stable since 1992. Since 1984, hours worked by LVNs per case-mix adjusted patient day declined, while unlicensed aide hours increased. It is expected that average nursing hours per patient day will increase when minimum nurse-to-patient ratios are implemented in January 2004.

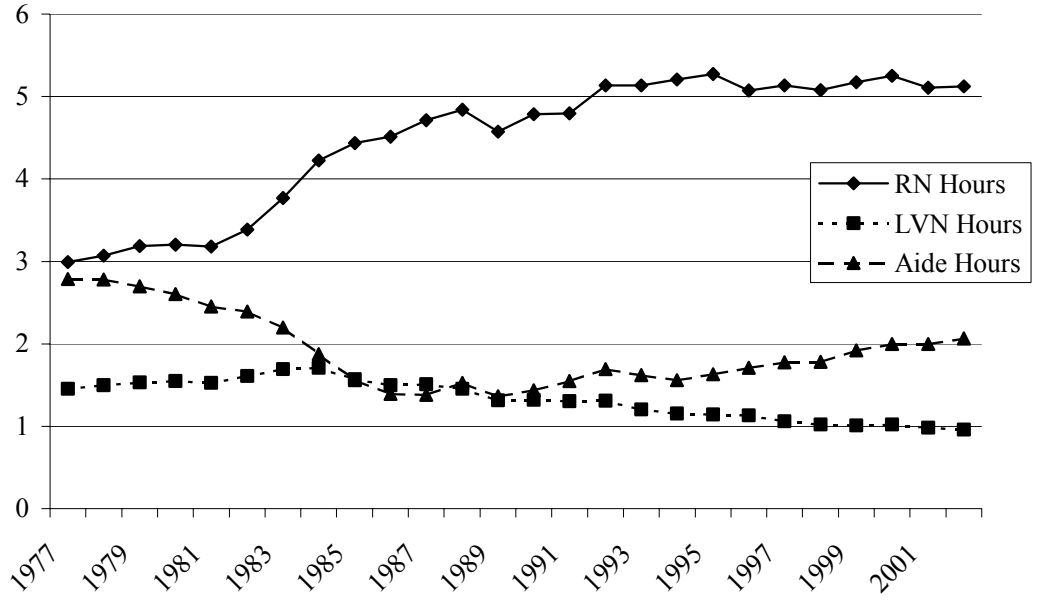
Average RN hours per case-mix adjusted discharge also rose from 1977 to 1992 (Figure 28). Since 1992, however, there has been a decline in RN nursing service hours per discharge. This is because the number of patient days fell faster than discharges, as the average length of inpatient hospital stays declined. Whether the future will reveal further declines in average length of stay and in nursing personnel hours per case-mix adjusted discharge is unknown.

Figure 26: Average Per-Hospital Nursing Hours in Total Daily Services, California, 1977-2002



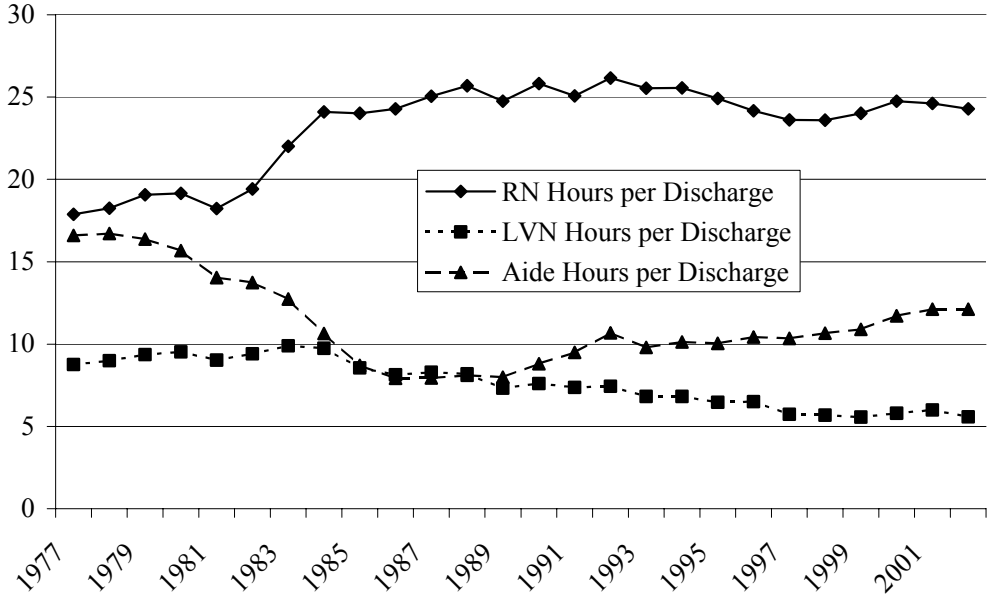
Source: California Office of Statewide Health Planning and Development

Figure 27: Average Per-Hospital Nursing Hours per Case-Mix Adjusted Patient Day, Total Daily Services, 1977-2002



Source: California Office of Statewide Health Planning and Development

Figure 28: Average Per-Hospital Nursing Hours per Case-Mix Adjusted Discharge, Total Daily Services, 1977-2002



Source: California Office of Statewide Health Planning and Development

Table 4 reports nurse staffing levels for long-term care facilities in the 2001/2002 fiscal year, based on OSHPD data. On average, long-term care facilities staff approximately 17 minutes of RN work for every patient day and about 36 minutes of LVN work for every patient day. RNs account for approximately nine percent of all nursing hours (including LVN and nurse assistant hours) at long-term care facilities while LVNs account for about 19 percent of all nursing hours. Temporary nurses only account for a small percentage of nursing hours at long-term care facilities.

At this point in time, the available data cannot adequately explain how employment levels of individual licensed nurses have changed over time. One potential way to bridge this gap is to combine State individual-level RN and LVN licensing administrative records with State individual-level employment data. Doing so would allow us to determine how many RNs and LVNs are employed on a quarterly basis, as well as track changes in employment across industries and regions of the state.

Table 4: Nurse Staffing Levels for Long-Term Care Facilities in California

	Median	Mean	Std. Dev.
RN Hours of Work			
Average Hours per Patient Day	0.28	0.35	0.55
Percent of All Nursing Hours	8.9%	9.7%	6.4%
Percent Temporary Staff	0.0%	3.2%	22.9%
LVN Hours of Work			
Average Hours per Patient Day	0.60	0.68	0.65
Percent of All Nursing Hours	18.9%	19.5%	7.6%
Percent Temporary Staff	0.0%	1.9%	9.2%

Source: Long-term Care Annual Financial Files, Office of Statewide Health Planning and Development (OSHPD), July 2001-June 2002.
Note: N=1,220

B. Wage Levels for the California Nursing Workforce

Analysis of nursing wage levels suffers from the same data limitation problems as the analysis of employment levels, but paints a fairly consistent picture. Table 5 reports mean wages for RNs and LVNs for 1998 to 2001 (adjusted to 2001 dollars) based on the OES. The same caveats and concerns regarding across-year comparisons of OES employment data applies to comparisons of the OES wage data. According to the OES data, average real wages for RNs in California increased slightly—and at about the same rate as the national average—between 1998 and 2001. Real wages for LVNs in California, however, decreased slightly while the national average increased slightly. As expected, nurses in California earned more than the national average throughout the period. The average hourly wage levels reported in the PUMS and the NSSRN are similar to those reported in the OES (see Table 6), suggesting some reliability in the OES data.

Within California in 2001, RNs working in doctor offices and clinics earned more on average than RNs working in other sectors, while RNs working in nursing care facilities earned less than other RNs. In 2001, LVNs working in personnel supply services earned more than LVNs working in other sectors, while LVNs working in home health care services earned less than other LVNs.[5]

The OSHPD data allow for a more detailed examination of wages for nurses in hospitals and long-term care facilities. Figure 29 presents average hourly wages paid to RNs, LVNs, and unlicensed nursing assistants in California hospitals from 1977 through 2002. All figures are in 2002 dollars. RN wages rose almost continuously through 1994, just as RN hours per case-mix adjusted patient day were increasing throughout this period. Between 1994 and 2000, RN wages declined, and since 2000 they have risen precipitously. Average hospital LVN wages show a similar pattern of growth, decline, and recovery as do RN wages.

[5] Except LVNs in the "other" sectors.

Table 5: Mean Wages for RNs and LVNs, 1998 to 2001 (in 2001 constant dollars)

	1998	1999	2000	2001	% Change ('98 to '01)
Mean RN Hourly Wage					
National	$22.50	$21.72	$22.19	$22.71	0.9%
California	$27.06	$26.42	$26.84	$27.27	0.8%
Hospitals	$27.63	$28.22	$28.08	$28.13	1.8%
Doctors Offices/Clinics	$27.87	$29.28	$30.57	$29.68	6.5%
Nursing Care Facilities	$22.58	$23.20	$23.79	$24.11	6.8%
Home Health Care Services	$26.89	$26.77	$26.45	$26.67	-0.8%
Personnel Supply Services	$27.77	$27.82	$28.04	$28.04	1.0%
Other	n.a.	$25.93	$26.15	$26.83	n.a.
Mean LVN Hourly Wage					
National	$14.65	$14.17	$14.57	$14.83	1.2%
California	$17.55	$17.45	$17.41	$17.41	-0.8%
Hospitals	$18.44	$18.72	$17.69	$17.42	-5.5%
Doctors Offices/Clinics	$18.72	$20.05	$19.73	$18.37	-1.9%
Nursing Care Facilities	$15.92	$16.28	$17.12	$17.42	9.5%
Home Health Care Services	$18.41	$17.93	$16.41	$16.54	-10.1%
Personnel Supply Services	$16.91	$17.34	$17.92	$19.24	13.8%
Other	n.a.	$16.24	$16.15	$16.42	n.a.

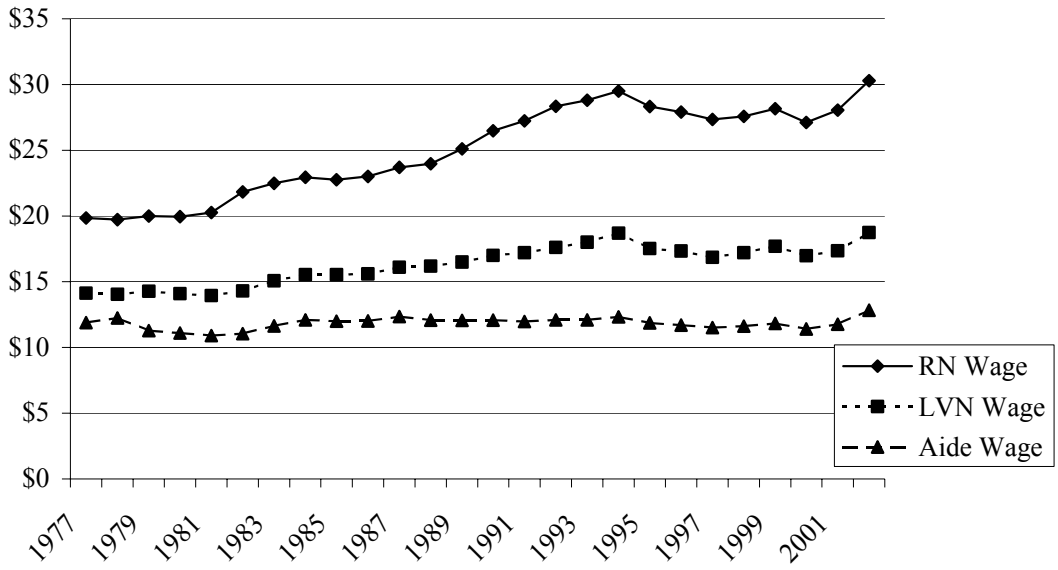
Source: Occupational Employment Statistics Survey, EDD, 1998-2001. Wages adjusted to 2001 dollars using the CPI-U.

Table 6: Mean Hourly Wages for RNs and LVNs (in 2001 constant dollars)

	Registered Nurses			Licensed Vocational Nurses		
	Overall	Hospitals	Other	Overall	Hospitals	Other
PUMS, 1999						
National	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
California	$27.47	$28.49	$25.23	$17.77	$17.94	$17.61
NSSRN, 1996						
National	$24.35	$25.11	$23.19	n.a.	n.a.	n.a.
California	$29.11	$29.66	$28.14	n.a.	n.a.	n.a.
NSSRN, 2000						
National	$24.78	$25.50	$23.74	n.a.	n.a.	n.a.
California	$29.88	$30.44	$28.96	n.a.	n.a.	n.a.

Sources: National Sample Survey of Registered Nurses (NSSRN), 1996 and 2000, and Census 2000 Public Use Micro-data Sample (PUMS), 2000.
Notes: For the NSSRN, respondents reported their salary/wage at their principal nursing position. For the 2000 PUMS, respondents reported on their salary/wage at all jobs in 1999.

Figure 29: Average Per-Hospital Wages (in 2002 Dollars), California, 1977-2002



Source: California Office of Statewide Health Planning and Development

Table 7 reports hourly wage levels for RNs and LVNs working in long-term care facilities. The mean hourly wage for RNs in long-term care facilities is about $24.00—about the same rate reported in the 2001 OES data for nursing care facilities, suggesting some reliability across data sources. RNs in long-term care facilities earn about 28 percent more than LVNs and have a wage rate about 40 percent higher than the average wage rate in their region. The mean hourly wage for LVNs in long-term care facilities is about $19.00—almost two dollars more than the rate reported in the 2001 OES data for nursing care facilities (a discrepancy we will explore in more detail in the future). LVNs in long-term care facilities earn about 93 percent more than nurse assistants and have a wage rate about 10 percent higher than the average wage rate in their region.

Figure 30 shows median base wages reported in the CCOIS by experience level, and the wage spread (vertical bars) for the 25th to the 75th percentile range across employers. On average, the wages reported in the CCOIS data for RNs and LVNs are slightly lower than the wage levels reported in the other data sources. The difference between average wages based on the CCOIS data and wages based on the other data

sources could be due to the CCOIS sampling framework, which does not generate a statewide representative sample of firms. Due to the CCOIS sampling methods, it is likely that employers in rural (most likely lower wage) counties are over-represented in the CCOIS, thus artificially making average wages appear lower.

The lower wage rate for entry level nurses and those with three years of experience, compared to average nursing wages, is expected because of the skewed distribution of experienced workers in the nursing workforce. This is particularly true for RNs, where the median wage for a three year experienced nurse is about 20 percent higher than the entry level wage ($25.00 vs. $20.00). The median wage for LVNs with three years of experience is about 17 percent higher than the entry-level wage for LVNs ($16.70 vs. $14.30). Preliminary analysis of wages for teachers indicates a similar 17 percent increase from entry level to experienced.

The wage spreads shown in Figure 30 suggest that wages vary significantly across employers. Variation in work/skill requirements across industry sectors is one reason for this variation. For example, RNs working in medical doctor offices and clinics earn more than RNs working in nursing care facilities, as discussed above.

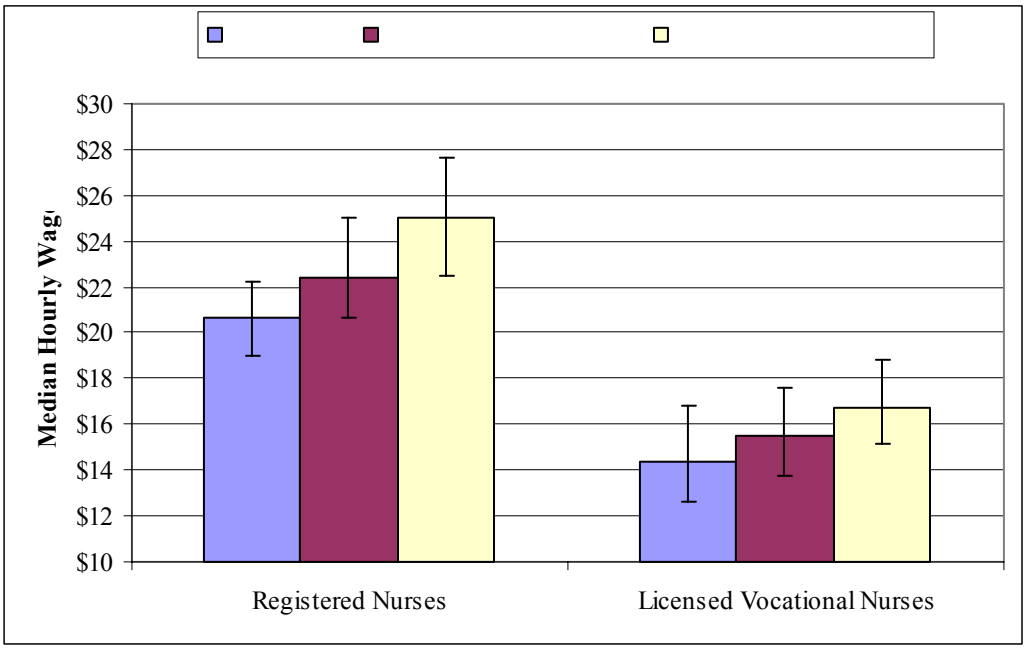
Even within industries, however, a substantial wage spread exists across employers. Figures 31 and 32 plot the distribution of hourly wages across firms, by industry, for RNs and LVNs respectively. In the figures, each box represents the wage range across firms from the 25th percentile to the 75th percentile, with the median

Table 7: RN and LVN Hourly Wage Levels in Long-Term Care Facilities (2001)

	Median	Mean	Std. Dev.
RN Hourly Wages			
Average Wage	$24.33	$24.37	$4.32
As Percent of LVN Wages	128.1%	128.4%	19.2%
As Percent of Ave. Regional Wage	140.9%	140.8%	25.3%
LVN Hourly Wages			
Average Wage	$18.50	$19.13	$3.37
As Percent of Nurse Assist. Wages	191.8%	193.4%	30.8%
As Percent of Ave. Regional Wage	107.8%	110.3%	17.9%

Source: Long-term Care Annual Financial Files, Office of Statewide Health Planning and Development (OSHPD), July 2001-June 2002. Regional wage data from Occupational Employment Statistics Survey, EDD, 2000.
Note: N=1,220.

Figure 30: Average Hourly Wages for RNs and LVNs, by Experience Level (2002)



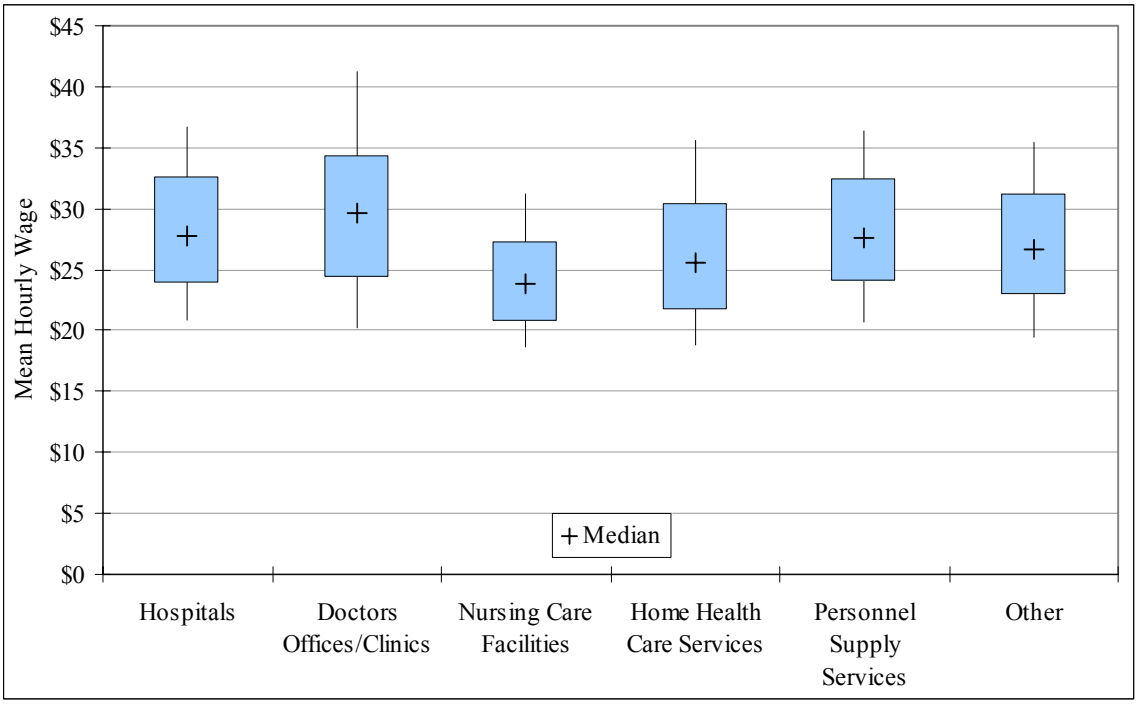
Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.
Notes: Hourly wages are adjusted to 2002 dollars and reflect the median wage offered by each firm, weighted by the number of employees at the firm. The vertical bars indicate the 25th to 75th percentile range.

(50th percentile) designated by an "+" and the 10th percentile to the 90th percentile range designated by the vertical bars. For RNs in doctor offices and clinics the wage spread is about $10 per hour from the 25th to the 75th percentile and about $20 from the 10th to the 90th percentile. The distribution is slightly tighter around the median in the other industries, and much tighter in the nursing care facilities industry. For LVNs, the wage spread is not as pronounced as it is for RNs. The largest wage spread is found for doctor offices and clinics and personnel supply services—both of which are primarily comprised of private, for-profit businesses.

Geographic wage differentials explain some of the variation in nurse wages across employers. For example, nurses working in the San Francisco Bay Area earn more, on average, than nurses in other regions of the State. Most regional variation in wages, however, is a result of regional variation in the cost of living. One way to control for the regional variation in the cost of living is to examine the geographic variation in the ratio of average nursing wage to the overall average wage in the region. Figures 33 and 34 show the variation in this ratio across California regions for RNs and LVNs respectively.

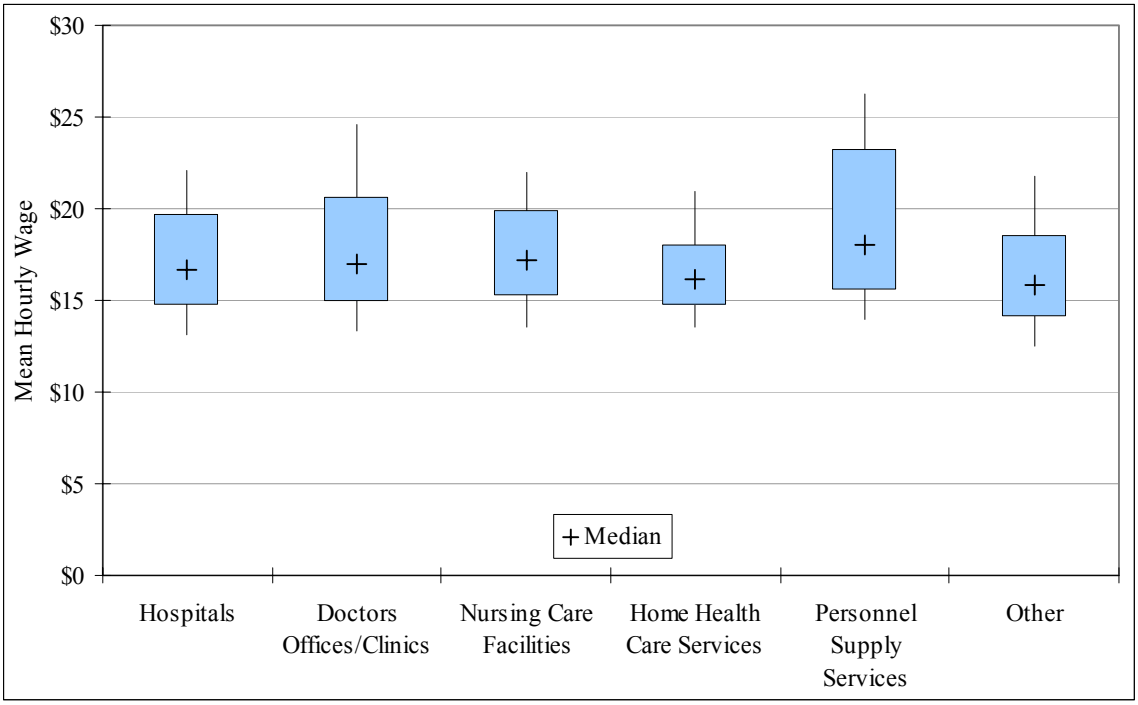
For both RNs and LVNs, the wage ratio is lower in the Bay Area relative to other California regions. RNs and LVNs in the Central Valley, and LVNs in the north, tend to have a higher wage ratio relative to other regions. This suggests that there is a wage premium for nurses working in the Central Valley and other regions with a high wage ratio.

Figure 31: Distribution of RN Hourly Wages across Firms, by Industry (2001)



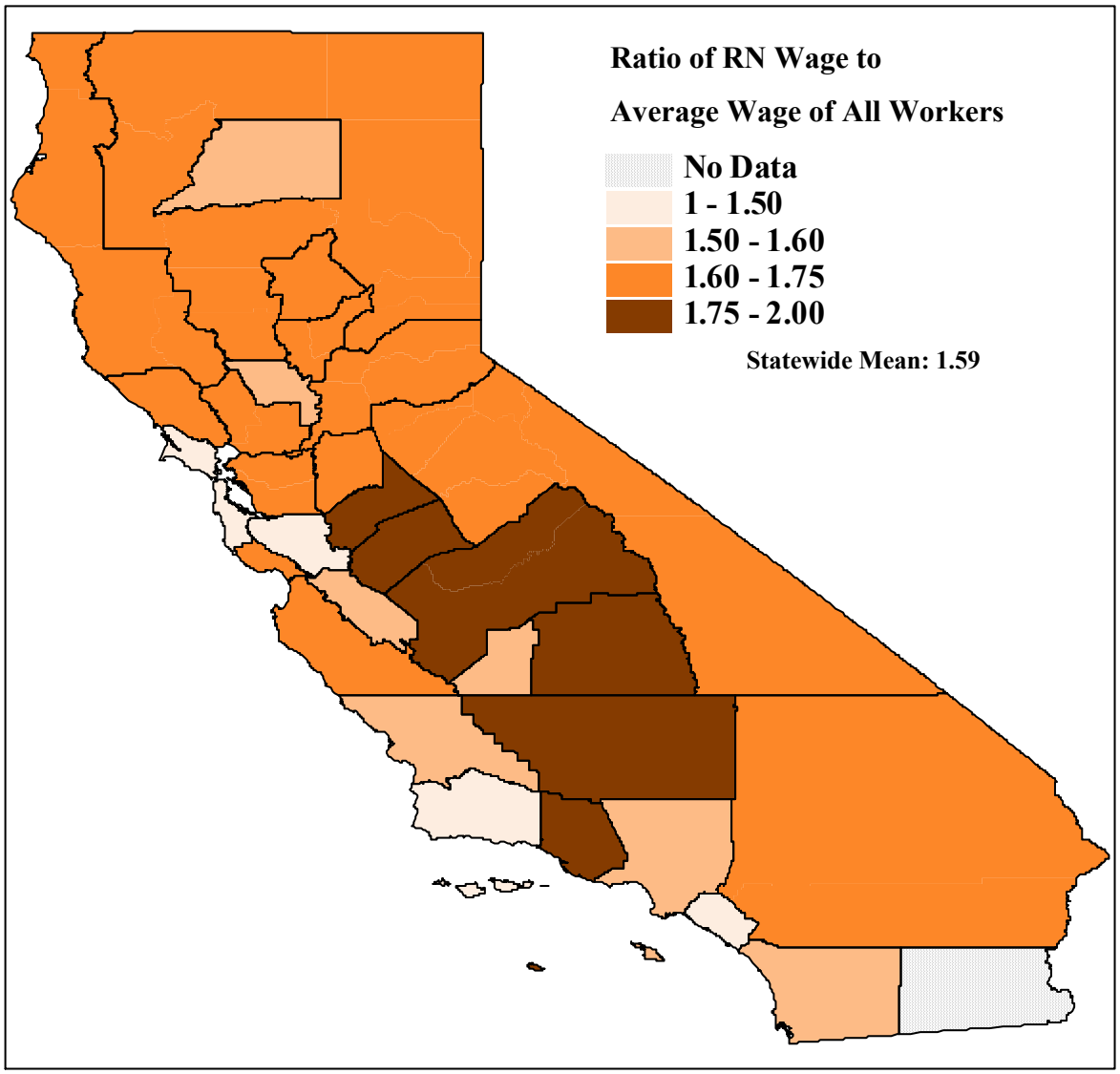
Source: Occupational Employment Statistics Survey, EDD, 2001.
Notes: Each box represents the wage range across firms from the 25th percentile to the 75th percentile, while the vertical bars represent the range from the 10th percentile to the 90th percentile.

Figure 32: Distribution of LVN Hourly Wages across Firms, by Industry (2001)



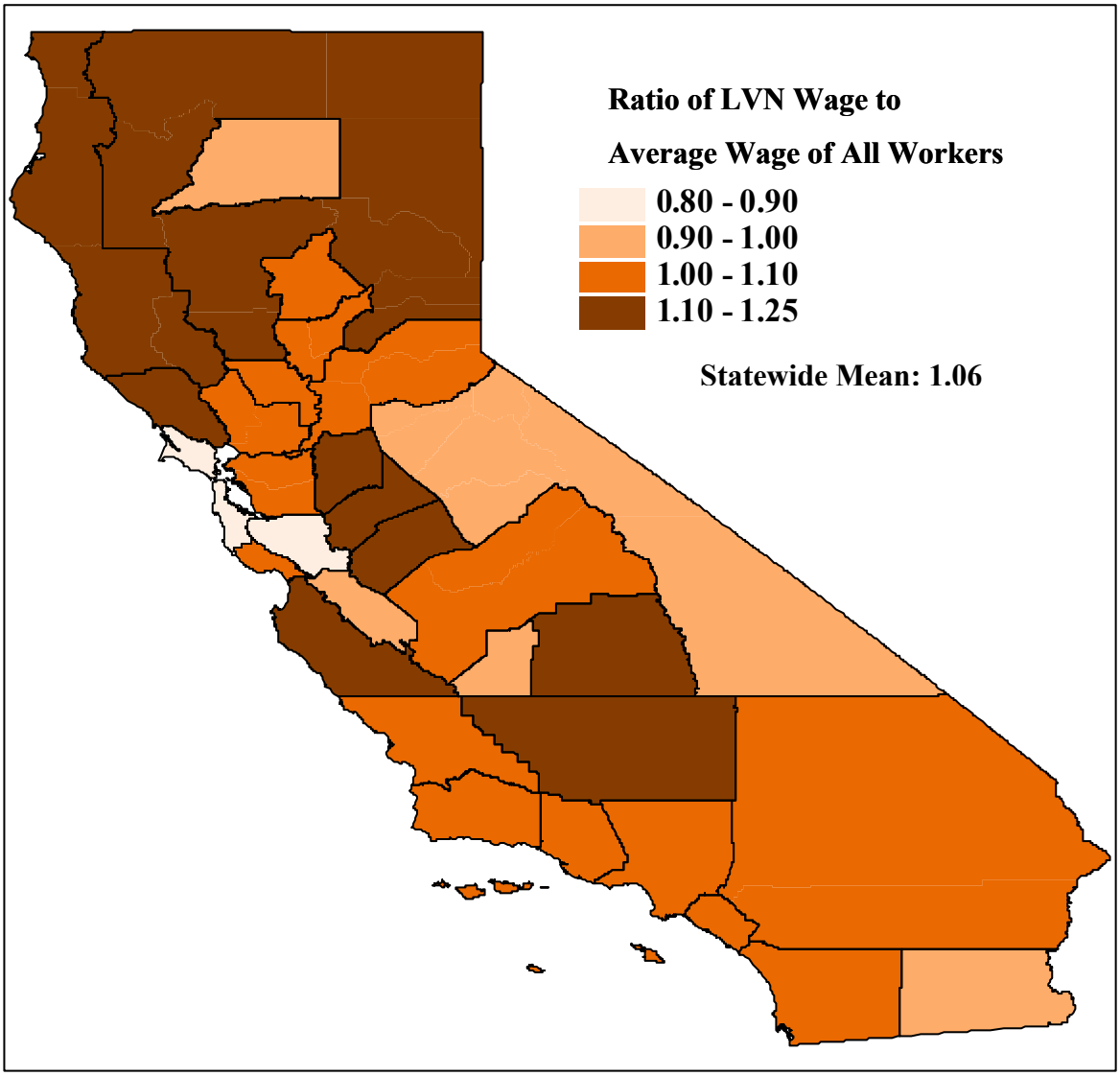
Source: Occupational Employment Statistics Survey, EDD, 2001.
Notes: Each box represents the wage range across firms from the 25th percentile to the 75th percentile, while the vertical bars represent the range from the 10th percentile to the 90th percentile.

Figure 33: Relative Level of RN Hourly Wages across California Regions (2001)



Source: Occupational Employment Statistics Survey, EDD, 2000.
Notes: Regions reflect county groupings based on U.S. Census defined metropolitan areas and EDD defined regions for counties not included in a metropolitan area. Each region's wage ratio equals the mean hourly wage for RNs in the region divided by the mean hourly wage for all occupations in the region.

Figure 34: Relative Level of LVN Hourly Wages across California Regions (2001)



Source: Occupational Employment Statistics Survey, EDD, 2000.
Notes: Regions reflect county groupings based on U.S. Census defined metropolitan areas and EDD defined regions for counties not included in a metropolitan area. Each region's wage ratio equals the mean hourly wage for LVNs in the region divided by the mean hourly wage for all occupations in the region.

C. Job benefits

Analysis of CCOIS data suggests that most full-time and part-time nurses are offered job benefits.[6] Figure 35 reports the percent of full-time and part-time nurses and teachers (a comparable/competing occupation) offered employer provided medical benefits. Figure 36 reports the percent offered retirement benefits. Almost all full-time RNs are offered medical benefits and over 90 percent of part-time RNs are offered medical benefits. The offer rate for full-time LVNs is slightly lower than the full-time RN rate, but the rate for part-time LVNs is significantly lower than the part-time RN rate (60 percent vs. 90 percent). The offer rate for part-time RNs also is high relative to the rate for part-time teachers (90 percent vs. 65 percent).

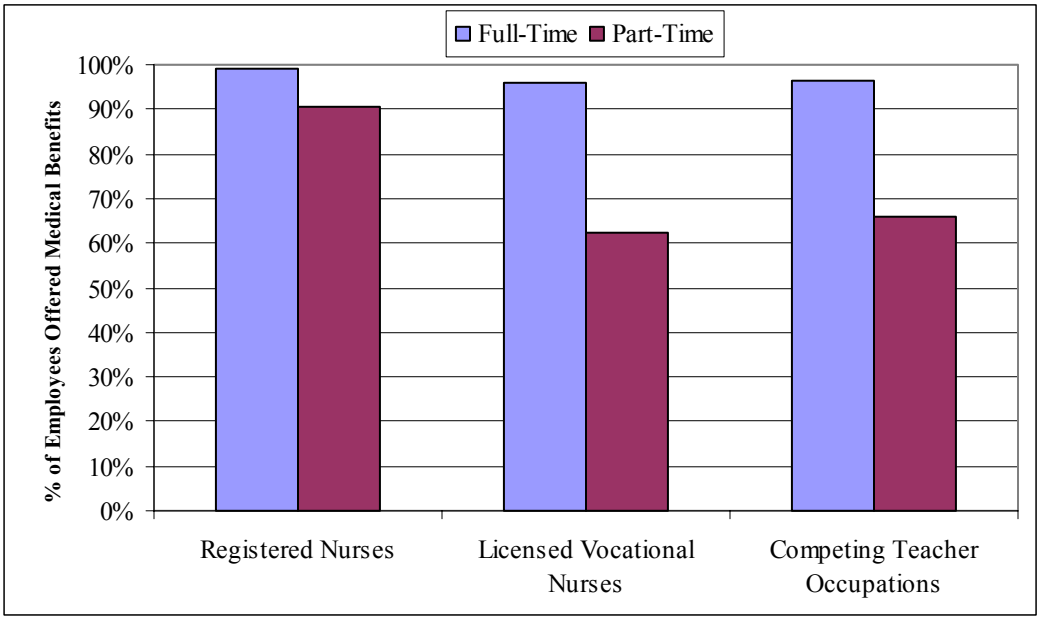
Just fewer than 90 percent of RNs are offered retirement benefits, while about 75 percent of full-time and 60 percent of part-time LVNs are offered retirement benefits. The rate for full-time RNs is a little lower than the rate for full-time teachers, but the rate for part-time RNs is significantly higher than the rate for part-time teachers. Not shown are the rates for dental benefits, sick time, and vacation time. For RNs, LVNs, and teachers, the offer rates for these benefits were similar to, although slightly lower than, the medical benefits rates. The one exception is that less than one-third of teachers are offered paid vacation time, which is likely due to the vacation time built into their work schedule.

A qualitative assessment of job benefits available to nurses comes from the Survey of California Nurses conducted by the California Board of Registered Nursing (BRN). While we do not have similar information for other occupations or time periods, the BRN survey results indicate that a majority of RNs are satisfied or very satisfied with the job benefits available to them (see Figure 37). However, one-quarter of RNs are either dissatisfied or very dissatisfied with their available benefits. Since the vast majority of nurses are offered benefits, this dissatisfaction is likely due to the quality of the available benefits and not the lack of benefit availability.

---

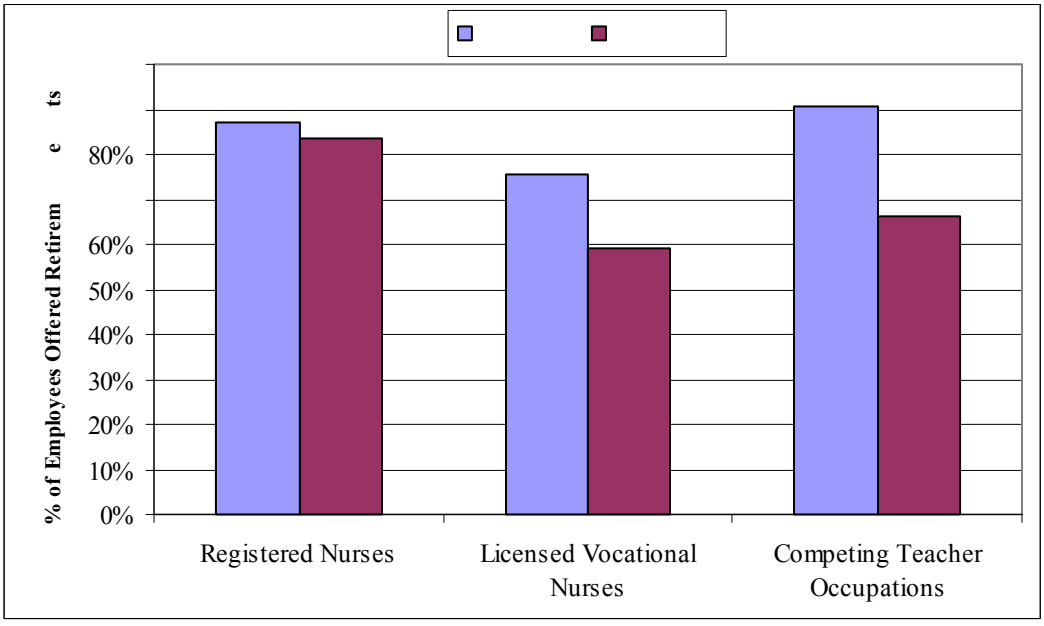
[6] The CCOIS data only allow us to examine benefits *offered* to employees, and not how many employees actually use the benefits (take-up rates). Also, the data do not allow us to identify which firms offer benefits to the worker's family.

Figure 35: Availability of Employer Provided Medical Benefits



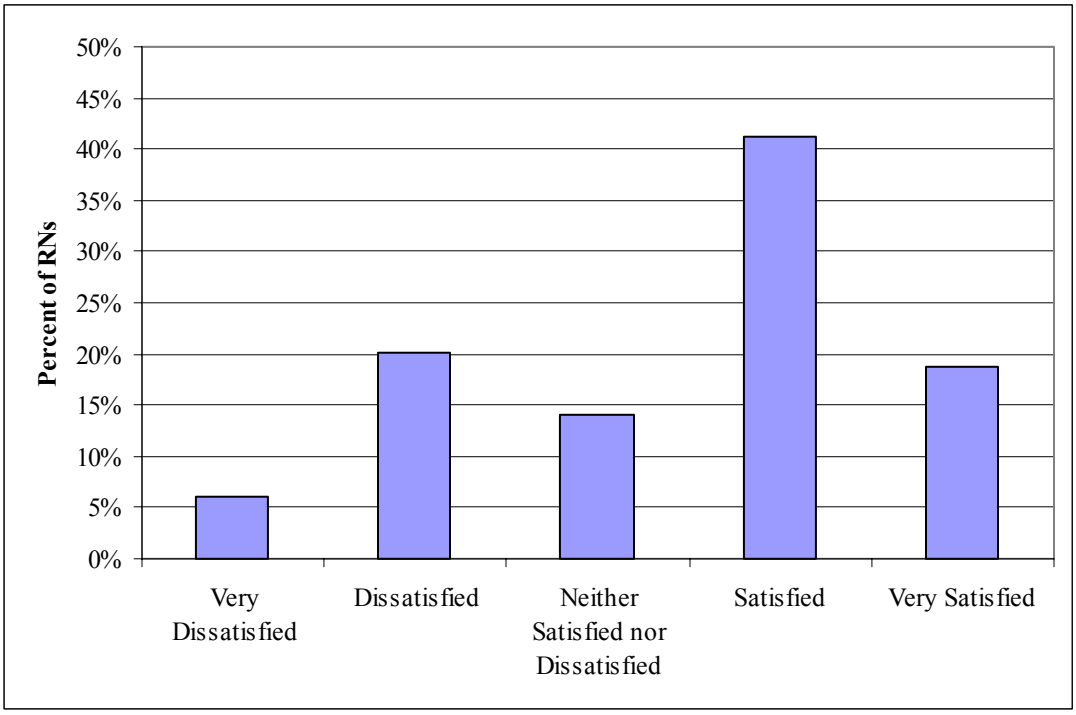
Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

Figure 36: Availability of Retirement Benefits



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

Figure 37: Registered Nurse Attitude toward Available Job Benefits



Source: Survey of Registered Nurses in California, BRN, 1997.
Notes: N=7,466

D. Inter-firm Mobility

An examination of cross-sectional data on job tenure suggests that, on average, registered nurses work for an employer about the same length of time as other employees. At a given point in time, registered nurses on average have worked about five to seven years for their current employer, which is similar to the average for all workers and slightly less than the average for elementary school teachers (see Table 8). Job tenure of registered nurses appears to vary across industries, however. Nurses working in hospitals have the longest tenure with their employer (about six to eight years), while nurses working in home health care services have the shortest tenure (about two to four years).

Analysis of the NSSRN and the CCOIS also suggests that nurses have relatively stable employment. In 2000, over 80 percent of registered nurses in California worked for the same employer as they did in 1999, 76 percent in the same position (see Figure 38). About 11 percent of RNs in the 2000 survey worked for a different employer in

1999. These rates are consistent with the rates in 1996, the rates for RNs working in California hospitals, and the rates for RNs working in other states (not shown).

From an employer perspective, about 25 percent of the RN workforce is comprised of employees hired within the past year, at a given point in time; 30 percent of the LVN workforce is hired within the past year (see Figure 39). About seven percent of the nursing workforce is added over a year to expand the size of the workforce (growth).[7]

We can estimate a firm-based one-year turnover rate for nurses by restricting the analysis to new hires resulting from vacant positions (i.e., excluding jobs added for growth). The mean turnover rate for firms is 21 percent for registered nurses and 24 percent for licensed vocational nurses. These turnover rates are higher than the rate for competing teacher occupations (16 percent), but close to the rates for competing health occupations (20 percent) and other competing occupations (26 percent). Figure 40 shows the distribution of firms by their estimated occupational turnover rate. The majority of firms have occupational turnover rates less than 20 percent. A small percent of firms actually have turnover rates greater than 100 percent, but these extreme turnover rates do not appear to be more prevalent for nurses.

The analysis presented in this section provides a fairly consistent picture of job turnover and stability for nurses, but is limited by the cross-sectional nature of the data. To get a more comprehensive understanding of the labor market dynamics of nurses, one needs to analyze longitudinal data on nursing employment patterns. One potential way to examine employment patterns in more detail is to match individual-level RN and LVN licensing administrative records with State individual-level employment data. Doing so would allow us to examine the number of years nurses remain employed with a particular employer, decomposing the analysis by different periods of time and different industries. Furthermore, we could identify where nurses go once their employment ends with a particular employer. For example, do they obtain employment with another employer in the same industry, in a different health care industry, or gain employment outside of health care? Or, do they exit the California workforce altogether?

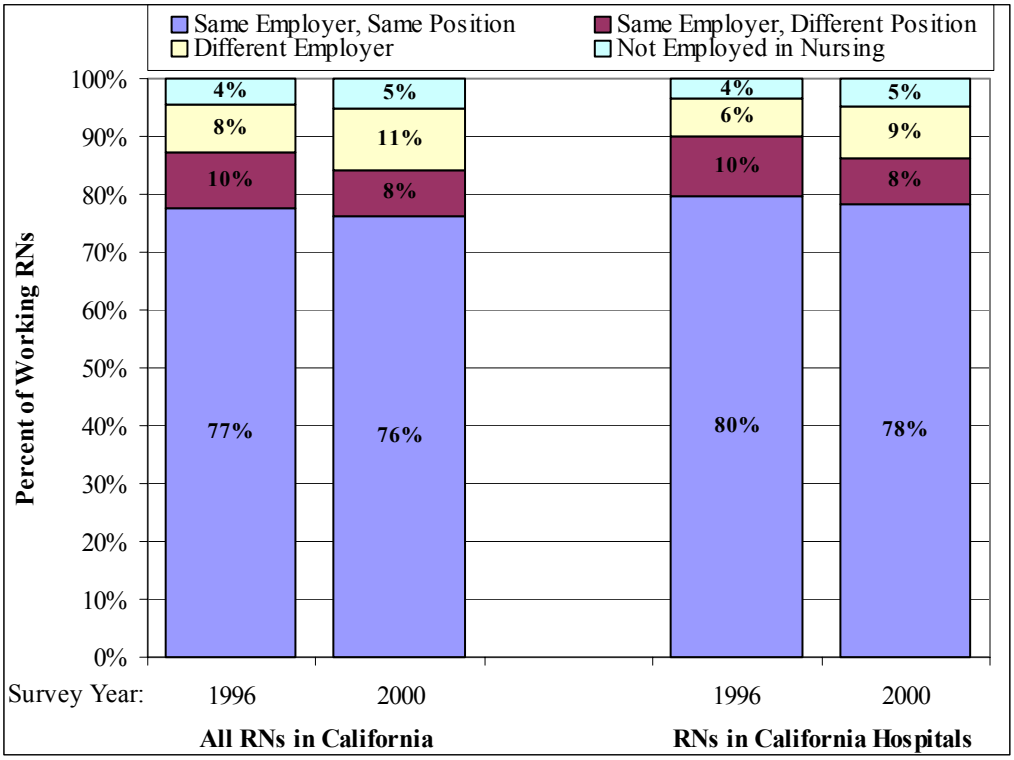
[7] New hires added for growth should not be counted as job turnovers.

Table 8: Number of Years of Continuous Work with Current Employer, Registered Nurses

	Sample Size	Mean	25th %tile	Median	75th %tile
California Registered Nurses[a]	6,836	7.3	2.0	5.0	10.4
Hospitals	4,026	8.0	2.4	6.0	11.6
Doctors Offices/Clinics	685	6.8	1.8	4.2	9.8
Nursing Care Facilities	380	6.5	1.4	3.6	9.3
Home Health Care Services	310	4.0	1.0	2.5	5.0
Personnel Supply Services	416	5.0	1.3	2.7	6.6
Other	1,019	7.1	2.0	4.7	10.1
Registered Nurses[b]					
California	123	7.4	2.0	6.0	10.0
United States	1,710	7.5	1.8	5.0	11.0
Elem. School Teachers[b]					
California	145	8.1	1.0	6.0	12.0
United States	1,775	9.9	2.2	7.0	15.0
All Workers[b]					
California	8,632	6.6	1.0	4.0	10.0
United States	105,710	7.1	1.0	4.0	10.0

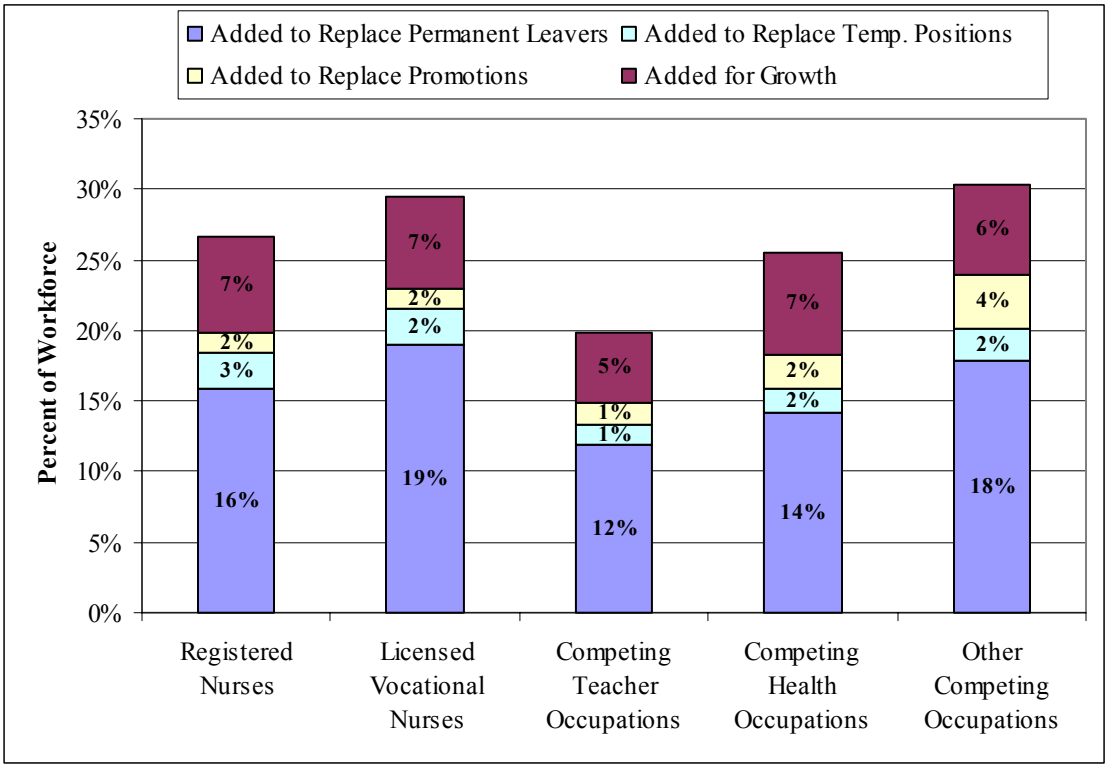
Sources:
[a] Survey of Registered Nurses in California, BRN, 1997.
[b] Current Population Survey, February Supplement, 1998 and 2000 pooled.

Figure 38: Previous Year Employment Status of Working Registered Nurses



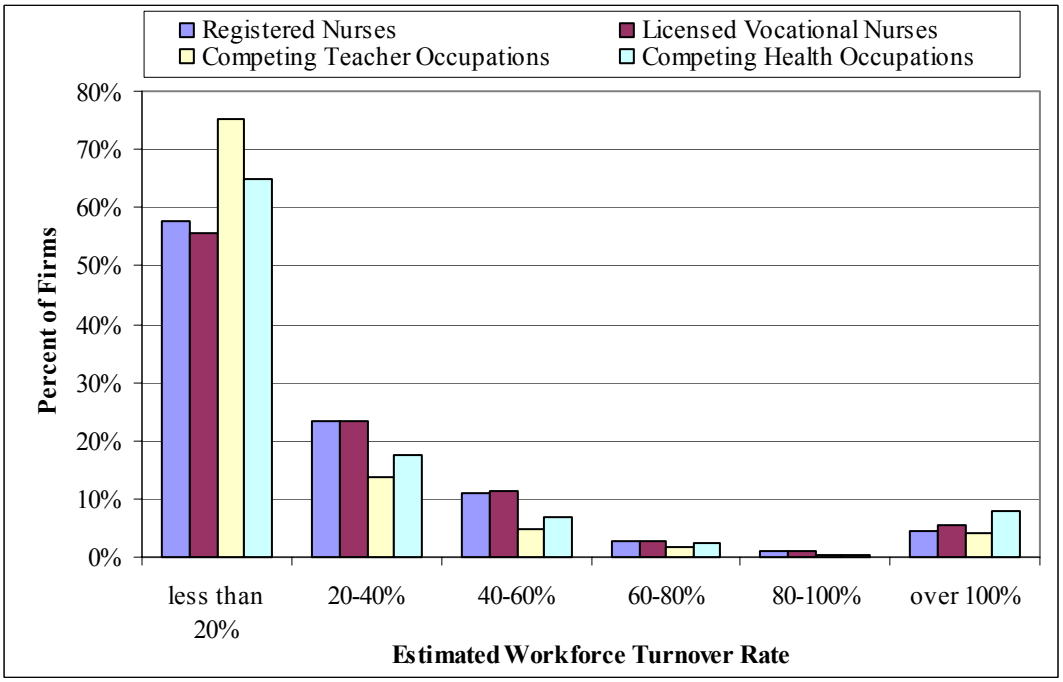
Source: National Sample Survey of Registered Nurses (NSSRN), 1996 and 2000.

Figure 39: Reasons for New Hires within the Past Year, by Occupation



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

Figure 40: Distribution of Firms by Occupational Turnover Rate



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

E. Working Conditions

Working conditions, particularly in acute care hospitals, have drawn attention from a variety of groups, most notably nursing unions. Nurse advocates believe that poor nurse-to-patient ratios, "mandatory" overtime, problems with workplace safety, and other factors have driven people away from nursing (ANA, SEIU). Without workplace reform, these advocates argue, the nursing shortage will not be permanently remedied. These advocacy groups have turned to legislative action in some states to address working conditions. For example, legislation passed in California in 1999 requires that the State establish minimum nurse-to-patient ratios in acute care hospitals. Similar legislation has been considered or is being considered in at least 12 other states. In March 2002, five state nursing organizations broke away from the American Nurses Association because these organizations intend to lobby for minimum nurse-to-patient ratios, which the ANA does not support. Legislation restricting "mandatory" overtime has been introduced in at least 14 states and in the U.S. Congress.

F. The Role of Unions in the Labor Market for Licensed Nurses

In the past decade, there has been resurgence in union activity in the health care industry in California, particularly in hospitals (Engstrom, 1994; Sherer, 1994; Forman and Davis, 2002). For example, between 1997 and 2002 the California Nurses Association won elections to represent registered nurses (RNs) in over 20 hospitals. The importance of unions in determining how hospitals are managed, how patients are cared for, and what legislation is enacted is rising, with unions taking credit for wage increases across the nation, hospital worker safety improvements, and the implementation of minimum nurse-to-patient ratios in California.

In theory, unions primarily are interested in the wages, employment security, and working conditions of their members (Baumol and Blinder, 1991). They bargain with employers to ensure that any profits (or net revenues) received by employers are distributed to employees, at least in part. Researchers generally have found that hospital unions increase the wages and fringe benefits of workers represented by the unions (Link and Landon, 1975; Becker, 1979; Feldman and Scheffler, 1982; Hirsch and Schumacher,

1995), and that there is a corresponding increase in total hospital costs (Miller, Becker, and Krinsky, 1979).

Unions have both direct and indirect effects on wages and benefits; that is, unions can affect wages both at the hospitals they organize and at neighboring hospitals (Feldman and Scheffler, 1982; Hirsch and Schumacher, 1998). Direct wage premiums arise from union contract bargaining for higher wages. Indirect wage effects usually are attributed to employers that do not have unionized employees facing a threat of unionization. These employers offer higher wages to stave off union activity.

The improved wages and benefits enjoyed by union members affect their attachment to their jobs. Research has shown that job tenure is higher and quit rates are lower in unionized firms (Bruggink et al., 1985), and that hospital unions reduce turnover rates for hospitals (Becker, 1978).

VI. Shortage and surplus cycles

Reports of nursing shortages in the United States have arisen regularly over the past 60 years (Yett, 1975; Friss, 1994). Prior to the current shortage, the most recent shortage was reported in the late 1980s and early 1990s (Aiken and Mullinix, 1987). By the mid-1990s, complaints of shortage were replaced with concerns that there was an oversupply of nurses, largely due to the growth of managed care in the United States (Aiken, Sochalski, and Anderson, 1996; Buerhaus and Staiger, 1996). However, by 1998, stories of shortage resurfaced, particularly in nursing specialties such as critical care and on the western and eastern coasts of the United States (Gurnon, 1997; Kilborn, 1999). Estimates of average nursing vacancy rates at hospitals range from 10.2 percent to 13 percent, with one in seven hospitals reporting more than 20 percent vacancy rates for RNs (First Consulting Group, 2001; The HSM Group Ltd., 2002).

A shortage of labor is defined as occurring when the supply of labor is not as large as the demand for that labor, at the current wage. When there are shortages of labor, employers respond by increasing the wages they offer. These wage increases have three effects on the supply of labor. First, they make currently employed individuals more likely to take jobs with the employers who offer the higher wages, thus increasing supply to particular employers. This does not affect the market-wide shortage. Second, individuals who previously chose to not work are more likely to seek employment and individuals who are presently working will increase the number of hours they work because the financial gain from working is higher. This will alleviate the shortage to the extent that net labor supply is increased. Third, individuals are more likely to select the field of work, and thus will seek appropriate training. This will increase the supply of labor in the long-term, as individuals complete their training.

Wage increases also affect the demand for labor. As workers become more expensive, employers look for ways to reduce their need for those workers. Employers might substitute different types of workers, or they might invest in new equipment and processes that reduce the demand for labor.

The combined effect of these increases in supply and decreases in demand is a closing of the shortage. If supply and demand do not change rapidly, the shortage can

persist for some period of time, with continuing wage increases. For example, changes in supply or demand might not occur immediately because of a pre-established delay, such as the time it takes to train a worker. In this case, wages can continue to rise even as the new supply of workers is in the pipeline, thus inducing even more people to enter the training pipeline. The delay between individuals' choice of the nursing profession and the time they are licensed as nurses is a central reason for recurrent RN shortages. RN licensure requires three to five years of study in a college, university, or hospital-based diploma program. Growth in wages has historically led to growth in graduations, three to four years after the wage increases (Spetz and Given, 2003).

During the period when growth in supply is delayed due to educational requirements, the supply of nurses could rise because presently licensed nurses increase their employment. However, the data and research suggest that there is little room in the RN labor market for short-term supply increases. As reported earlier, labor force participation of RNs is very high, and of those not employed in nursing, nearly 70 percent were 50 years or older in 2000. Furthermore, a number of studies have examined the relationship between wages for RNs and their labor supply, generally finding that RNs are relatively unresponsive to wage increases (Link, 1992; Brewer, 1996; Buerhaus, 1993).

Demand for RNs should decline as the wages of RNs increase during a shortage. Indeed, there is some evidence that the wages of RNs and other nursing personnel affect the demand for RNs by hospitals. However, due to regulatory and institutional factors, demand for RNs may not be as responsive to wage increases as is necessary to close the gap between demand and supply. Most healthcare leaders recognize that nurse staffing affects quality of care, and thus are reluctant to reduce staffing. Moreover, many California hospitals are increasing their demand for RNs and LVNs to meet the new minimum nurse-to-patient ratios. Because of these factors, it is not clear that hospitals can reduce staffing of RNs even when they face extraordinary financial incentives to lower labor expenditures.

Shortages also may persist if wages do not adjust to signal to the market that increased supply and reduced demand are needed. Wages might not change if hospitals base their own wages on those of competitors or collude with each other. This creates a

long-term distortion in the supply/demand equilibrium, suppressing wages and perpetuating nursing shortages (Yett, 1975).

Nursing shortages also might be hospital-specific; in other words, a particular hospital might experience a shortage of nurses even when the market at large does not face shortage. Seago et al. (2001) found that demographics of a hospital's local population and a hospital's type of nursing care delivery system consistently predict hospitals that face nursing shortages. In particular, hospitals with high shares of their patients insured by Medicaid and Medicare are more likely to report a RN shortage.

A. Measurement of the Nursing Shortage

The notion of a nursing shortage has been highly publicized and widely discussed. This section attempts to add to this discussion by providing some empirical indicators of a nursing shortage. The following does not, by itself, identify the existence of a shortage nor quantify the extent of a shortage. It does, however, present analysis that is consistent with the notion of a shortage.

The discrepancy between the number of openings and resumes posted on the CalJOBs Electronic Database provides a clear example of the potential shortage (see Figure 41). The monthly average number of registered nurse job openings posted on CalJOBs in 2002 is over 60 times greater than the number of resumes posted to fill those positions. For licensed vocational nurses the difference is not as great, but still represents an extreme discrepancy between job openings and resumes. While the differences between job openings and resumes could simply be the result of disparate use of the CalJOBs system (i.e., potential workers are less likely to use the database than potential employers), it nevertheless documents a mismatch between demand and supply.

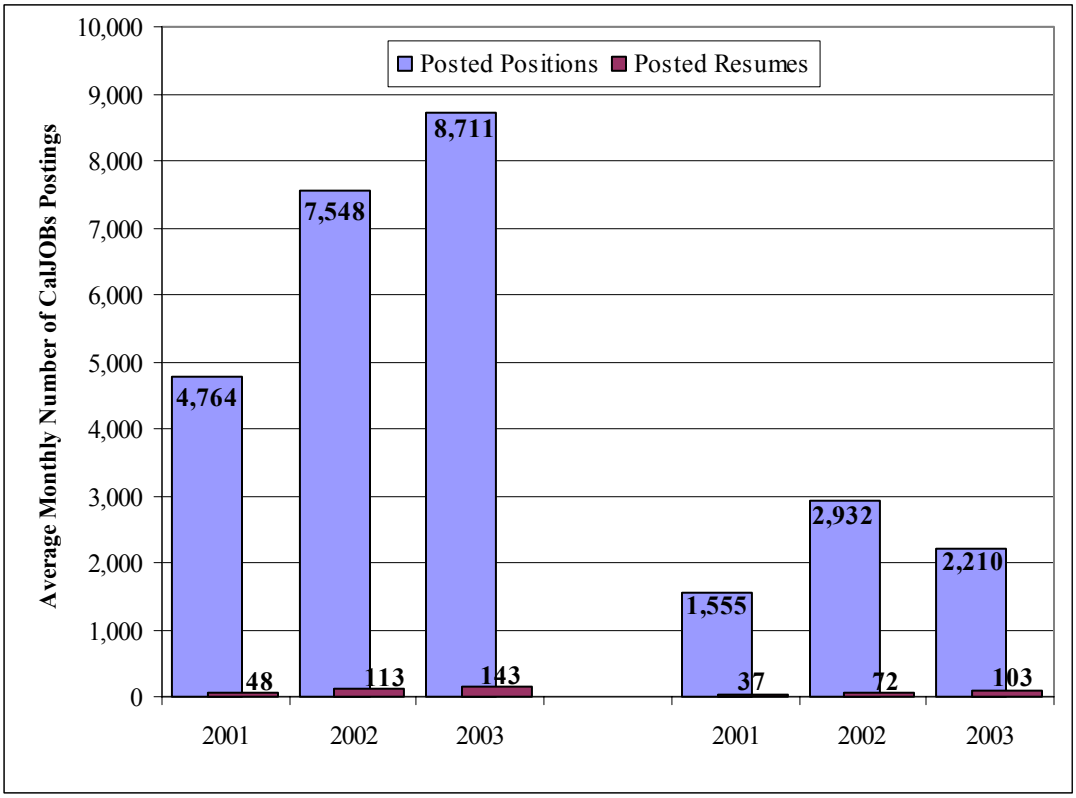
Another indicator of a labor market shortage is the extent of unemployment. According to the 2000 PUMS, only about 1.3 percent of registered nurses, and about 3.7 percent of licensed vocational nurses were unemployed in California. These rates are significantly lower than the overall California unemployment rate of about 6.9 percent, suggesting the labor market is much tighter for nurses. Analysis of state unemployment insurance (UI) claims in 1998 also indicates a tighter labor market for nurses. Of individuals making a valid UI claim in 1998, about 20 percent of the registered nurses

and 15 percent of the licensed vocational nurses were not unemployed long enough to collect benefits (see Figure 42). Only about 10 percent of all other occupations were not unemployed long enough. Furthermore, of those who did collect UI benefits, registered nurses and licensed vocational nurses collected benefits for a shorter period of time relative to other occupations at the median (see Figure 43).

For the final labor market report, we plan to identify which industries nurses regain employment in after their unemployment spell. For example: how many nurses laid-off from a position in a hospital regain employment in another (or the same) hospital; how many regain employment in another health care industry; how many regain employment outside of health care; and how many exit the workforce altogether?

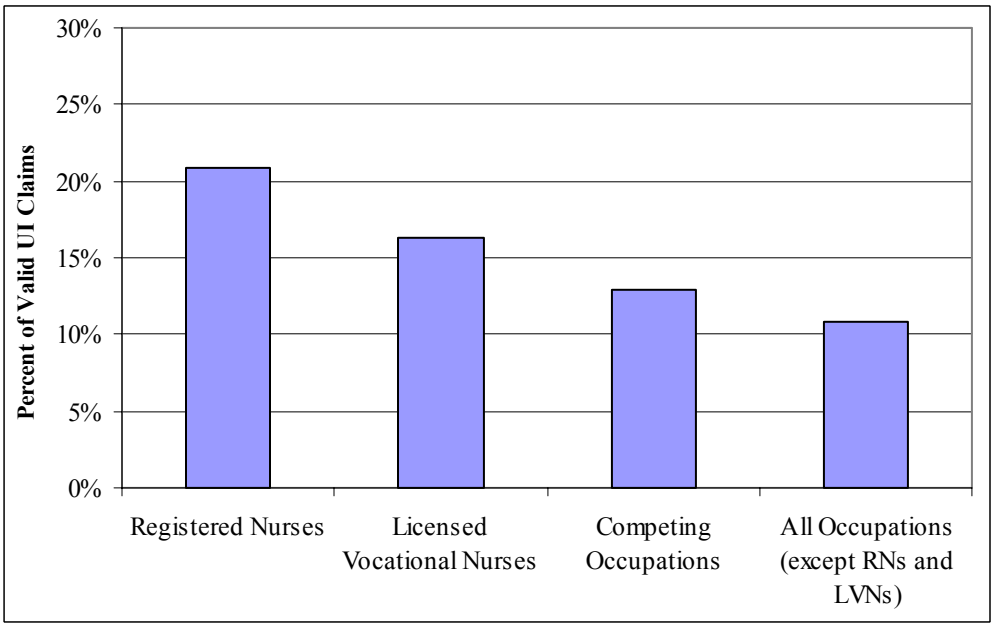
Employer-based data from the CCOIS also documents a potential shortage of nurses. Over 70 percent of employers reported difficulty (difficult or very difficult) finding qualified RN applicants and about 65 percent reported difficulty finding qualified LVN applicants (see Figure 44). These rates are higher than those reported for competing occupations. Almost half of employers reported that it was very difficult to find qualified RNs, which is about twice as great as those reporting that it was very difficult to find qualified applicants for other competing occupations.

Figure 41: Posted Job Openings and Resumes in the CalJOBs Electronic Database



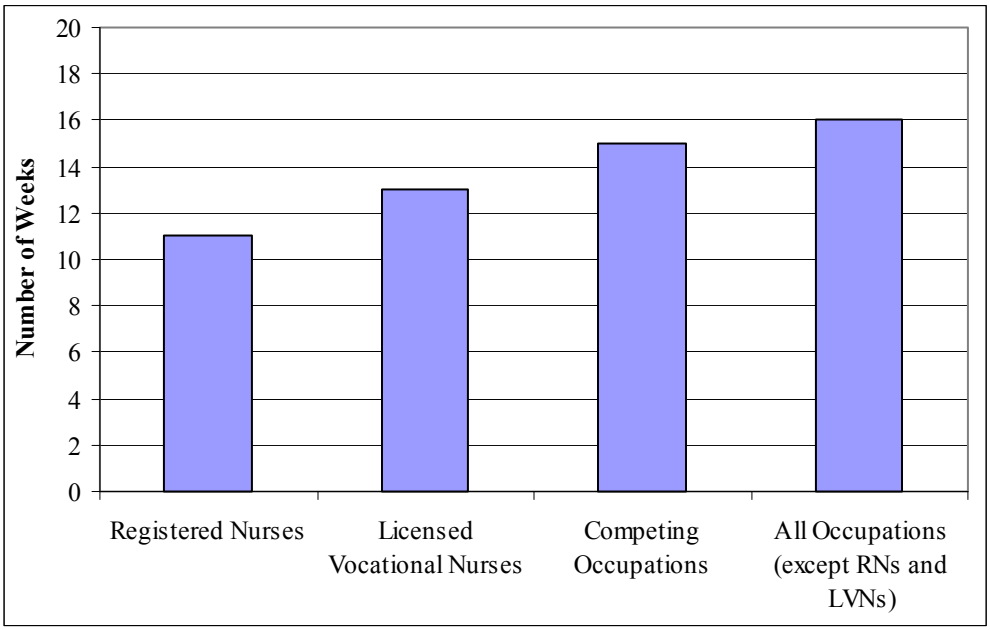
Source: CalJOBs Database, EDD, 2001-2003.
Notes: Data for 2003 only includes the first four months of 2003. RNs on left bars. LVNs on right.

Figure 42: Percent of UI Claimants not Collecting Benefits, by Occupation (1998)



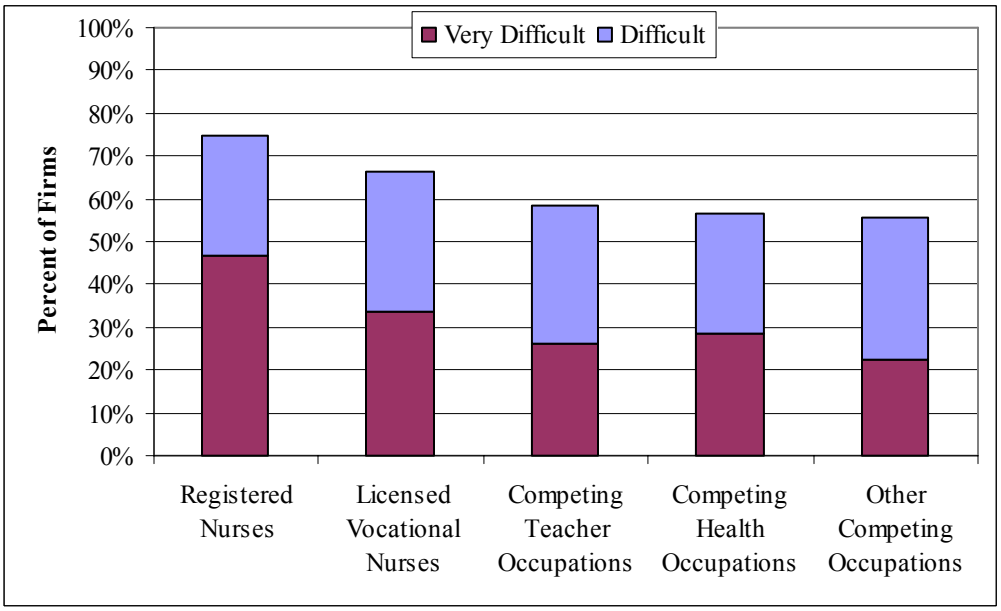
Source: Unemployment Insurance (UI) Claims data, EDD, 1998.

Figure 43: Median Number of Weeks Collecting UI Benefits, by Occupation (1998)



Source: Unemployment Insurance (UI) Claims data, EDD, 1998.

Figure 44: Employer Perceived Difficulty of Finding Qualified Applicants, by Occupation



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

B. Future Prospects

Most forecasts that have been published to date see no end to the shortage of RNs (Coffman and Spetz, 1999; Buerhaus, Staiger, and Auerbach, 2000; Levine, 2001; Maher, 2003). The Bureau of Health Professions in the U.S. Department of Health and Human Services projects that the shortage will worsen dramatically over the next 20 years, with a shortage of 800,000 nurses projected by 2020 (U.S. Bureau of the Health Professions, 2002). The nursing shortage is made even more worrisome by the fact that many other nations are experiencing similar shortages. The United Kingdom, Canada, Australia, Southeast Asia, and Southern Africa are among many nations and regions that report nursing shortages of varying magnitudes (Aiken, Clarke, and Sloane, 2002).

Hospitals have not idly watched the shortage worsen. They actively are seeking solutions to their own recruiting difficulties as well as the nationwide nursing shortage. The most obvious strategy is that of offering higher wages to nurses, as has been observed over the past few years. Given the likelihood that demand for RNs will not decline substantially even as wages rise, the labor market will depend on growth in the supply of RNs to reach equilibrium.

Most analyses of the State's nursing shortage find that too few nurses are being educated to meet future demand. Coffman and Spetz (1999) estimated that State nursing programs need to graduate an additional 3,600 students per year between 2000 and 2010 and 5,000 more per year between 2010 and 2020 to maintain an adequate nursing workforce. Rural counties, communities with high rates of poverty, and those that do not have RN education programs have the greatest difficulty attracting nurses (Seago et al., 2001). Unless California's nursing education programs can produce additional graduates, the nursing shortage could jeopardize public health.

VII. Directions for Continued Analysis

This preliminary analysis of the labor market for licensed nurses suggests several areas in which deeper understanding is required. Thus, pending availability of data, the NWI evaluation team will investigate these labor market issues over the next year:

1. *The labor supply behavior of individual nurses.* No publicly available source of data offers information about individual nurses over time. Thus, while one can examine the labor supply of nurses in a cross-sectional survey, individual nurses cannot be tracked to learn how their employment changes. Data from the Base Wage Files at the California Employment Development Department could fill this gap. Provided EDD can provide us with appropriate data, we will examine the movements of individual nurses across jobs and in and out of the labor market over time.
2. *The effect of minimum nurse-to-patient ratios on licensed nurse demand.* In January 2004, California implemented minimum staffing ratios in hospitals. While it is forecasted that these ratios will result in demand for an additional 5,000 nurses, it is not clear whether these nurses are available, or whether hospitals will employ RNs or LVNs to meet the new requirements. There will not be any public source of data with which to empirically investigate this question; thus, the evaluation team will rely on qualitative methods to understand how minimum staffing ratios affect demand for licensed nurses.
3. *The ability of nursing schools to expand to meet demand for nursing education.* As noted above, the wage increases observed during a nursing shortage should increase interest in nursing education. However, most California nursing programs have more applicants than spaces, and it is not clear whether programs can expand to meet demand. How the labor market responds to this barrier must be examined. The Annual Schools Reports of the Board of Registered Nursing will help us understand how schools increase their capacity.
4. *Job characteristics.* The Board of Registered Nursing is preparing a statewide survey of nurse employers to learn about their vacancy rates, time to fill

vacant positions, benefits offered to staff, and other characteristics. These data will provide invaluable information about the characteristics of jobs available to licensed nurses, particularly RNs.

5. *Labor force characteristics.* The Board of Registered Nursing has mailed a survey to RNs to learn about their employment, job satisfaction, earnings, education, and demographics. This survey is similar to the 1997 survey conducted by the Board. These data will provide updated information about labor force participation, nurse demographics, and other labor supply data. The BRN also is surveying nurses with inactive licenses, and nurses with active California licenses who do not live in California. These data will enable us to learn about segments of the RN labor force that previously have been unexamined.

As policymakers and researchers improve their knowledge of how the nursing labor market functions, and what interventions help bring the market into balance, State leaders can work proactively to avert nursing shortages.

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